

GENERAL CONSTRUCTION NOTES

1. NATURAL GRASS AND TREE AREAS SHALL BE LEFT UNDISTURBED AS MUCH AS POSSIBLE DURING CONSTRUCTION. ALL AREAS THAT HAVE BEEN DISTURBED DURING CONSTRUCTION SHALL BE RESEDED IN ACCORDANCE WITH THE GUIDELINES OUTLINED IN THE PERMANENT EROSION CONTROL SPECIFICATIONS.
2. EXISTING UTILITIES SHOWN ON THE PLANS ARE FOR REFERENCE ONLY AND DO NOT NECESSARILY REPRESENT THE EXACT LOCATION OF SUCH FACILITIES, NOR IS IT IMPLIED THAT ALL EXISTING UTILITIES ARE SHOWN ON THE PLANS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION.
3. THE CONTRACTOR SHALL REPAIR, AT HIS EXPENSE, ANY AND ALL EXISTING UTILITY MAINS AND SERVICES, DRAINAGE FACILITIES, DRIVEWAYS, CULVERTS, SIGNS, FENCES, MAIL BOXES, PROPERTY PINS, OR OTHER ITEMS DAMAGED DURING CONSTRUCTION TO THEIR ORIGINAL CONDITION OR BETTER.
4. THE CONTRACTOR SHALL ENSURE THAT ADEQUATE SAFETY PRECAUTIONS ARE MAINTAINED AT ALL TIMES REGARDING AREAS OF OPEN PIPE TRENCH. ALL PIPE TRENCH SHALL BE COVERED AT ALL TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS. THE TRENCH COVERING SHALL BE CAPABLE OF SUPPORTING TRAFFIC LOADS.
5. CONTRACTOR SHALL NOTIFY ENGINEER/OWNER 48 HOURS PRIOR TO STREET CUTS.
6. ALL TRENCH SAFETY CONSTRUCTION OPERATIONS SHALL BE ACCOMPLISHED IN ACCORDANCE WITH OSHA SPECIFICATION, CONTRACT DOCUMENTS WHICH INCLUDE A TRENCH SAFETY PLAN AND A PAY ITEM FOR TRENCH SAFETY MEASURES, AND SHALL BE IN COMPLIANCE WITH TEXAS HOUSE BILLS 662, AND 665.
7. EXCESS SPOILS SHALL BE PROPERLY DISPOSED OF BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE AS DESIGNATED BY THE COUNTY/ENGINEER. DISPOSAL SHALL TAKE PLACE ROUTINELY AND SHALL ACCUMULATE FOR A PERIOD OF NOT MORE THAN 5 WORKING DAYS BEFORE DISPOSAL.

SPECIAL CONSTRUCTION NOTES

1. THE CONSTRUCTION SPECIFICATIONS CURRENT AT THE TIME OF BIDDING SHALL GOVERN MATERIAL AND METHODS USED TO DO THIS WORK.
2. CONTRACTOR MUST NOTIFY COUNTY AND/OR ENGINEER TO OBTAIN PERMISSION TO CUT STREETS. AT LEAST 48 HOURS BEFORE BEGINNING ANY UTILITY CONSTRUCTION IN PUBLIC R.O.W. OR PUBLIC EASEMENT, THE CONTRACTOR SHALL NOTIFY ENGINEER AND THE COUNTY'S OPERATOR.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING EXISTING UTILITY LOCATIONS PRIOR TO ANY EXCAVATION. IN ADVANCE OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UTILITIES TO BE EXTENDED, TIED TO, OR ALTERED, OR SUBJECT TO DAMAGE/INCONVENIENCES BY THE CONSTRUCTION OPERATIONS.
4. NO OTHER UTILITY SERVICE/APPURTENANCES SHALL BE PLACED NEAR THE PROPERTY LINE, OR OTHER ASSIGNED LOCATION DESIGNATED FOR WATER AND WASTEWATER UTILITY SERVICE THAT WOULD INTERFERE WITH THE WATER SERVICE.
5. PRIOR TO EXCAVATION THE CONTRACTOR SHALL CALL TEXAS EXCAVATION SAFETY SYSTEM AT 1-800-DIG-TESS AND TEXAS 811.

CONSTRUCTION SEQUENCING

THE INTENT OF THIS SEQUENCING IS TO ARRANGE CONSTRUCTION TO PERFORM WATER & WASTEWATER LINE IMPROVEMENTS WITH A MINIMUM OF DISRUPTION AND WITH AS LITTLE WASTED EFFORT AND MATERIALS AS POSSIBLE.

1. PRE-CONSTRUCTION MEETING ATTENDED BY CONTRACTOR, ENGINEER, CITY STAFF NEW BRAUNFELS UTILITIES, UNION PACIFIC RAILROAD AS WELL AS GOVERNMENTAL REGULATORY AGENCIES.
 2. LOCATE ALL UNDERGROUND UTILITIES AND OTHER OBSTRUCTIONS THROUGHOUT PROJECT.
 3. PROVIDE TRAFFIC SAFETY & CONTROL MEASURES, EROSION & SEDIMENTATION CONTROLS, PROVIDE TRENCH SAFETY SYSTEM, PRIOR TO BEGINNING CONSTRUCTION.
 4. BEGIN CONSTRUCTION ON IMPROVEMENTS. KEEP ENGINEER/CITY/NBU UPDATED AT ALL TIMES OF CONSTRUCTION ACTIVITIES. INFORM ENGINEER/CITY/NBU IMMEDIATELY OF ANY DISCREPANCIES.
 5. COMPLETE CONSTRUCTION.
 6. PERFORM REQUIRED TESTS AND REPORT FINDINGS TO ENGINEER/OWNER.
 7. FINAL CLEAN UP AND DEMOBILIZATION.
 8. COORDINATION - ALL PHASES OF CONSTRUCTION SHALL BE COORDINATED WITH THE ENGINEER AT ALL CRITICAL POINTS SUCH AS DENSITY TESTING.
- FINAL STABILIZATION/ RE-VEGETATION IS REQUIRED PRIOR TO FINAL ACCEPTANCE.

UTILITY & EMERGENCY CONTACTS

THE UTILITY AND EMERGENCY CONTACTS ARE PROVIDED TO ASSIST THE CONTRACTOR AND ARE NOT INTENDED TO BE THE ONLY POSSIBLE LIST OF SERVICE PROVIDERS. THE RESPONSIBILITY OF CONTACTING ALL UTILITY PROVIDERS IN THE AREA REMAINS WITH THE CONTRACTOR.

NEW BRAUNFELS UTILITIES
KRISTIN GARZA
(830) 608-8919

AT&T
1-800-DIG-TESS

NEW BRAUNFELS UTILITIES
AMANDA CONLEY
(830) 608-8831

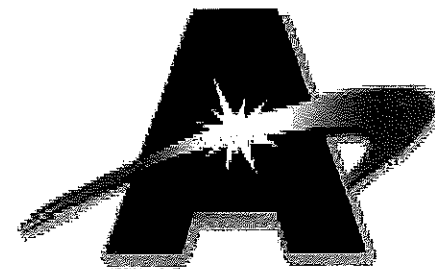
NOTES:

1. CONTRACTOR SHALL PROVIDE & INSTALL TRAFFIC CONTROL & SAFETY DEVICES PRIOR TO THE COMMENCE OF WORK WITHIN R.O.W. IN ACCORDANCE W/TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS & HIGHWAYS BY TxDOT.

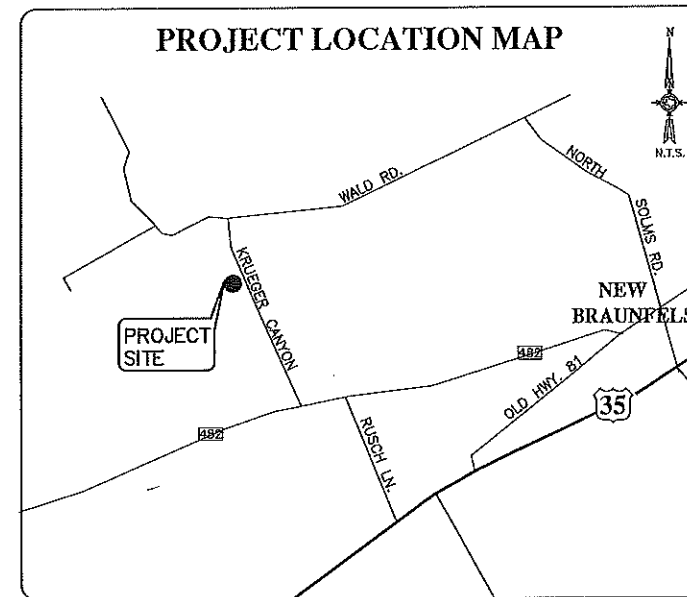
ANGEL BROTHERS FACILITY OFF-SITE WATER & WASTEWATER LINE IMPROVEMENTS NEW BRAUNFELS, TEXAS

SHEET INDEX

SHEET	DESCRIPTION
1	COVER SHEET
2	OVERALL MAP & NOTES
3	NOTES
4	W1 WATER LINE IMPROVEMENTS (BEGIN TO STA. 13+50)
5	W2 WATER LINE IMPROVEMENTS (STA. 13+50 TO STA. 16+00)
6	W3 WATER LINE IMPROVEMENTS (STA. 16+00 TO STA. 18+50)
7	W4 WATER LINE IMPROVEMENTS (STA. 18+50 TO STA. 21+00)
8	W5 WATER LINE IMPROVEMENTS (STA. 21+00 TO STA. 23+50)
9	W6 WATER LINE IMPROVEMENTS (STA. 23+50 TO STA. 26+00)
10	W7 WATER LINE IMPROVEMENTS (STA. 26+00 TO END)
11	FM1 FORCE MAIN IMPROVEMENTS (BEGIN TO STA. 6+00)
12	FM2 FORCE MAIN IMPROVEMENTS (STA. 6+00 TO STA. 8+50)
13	FM3 FORCE MAIN IMPROVEMENTS (STA. 8+50 TO STA. 11+00)
14	FM4 FORCE MAIN IMPROVEMENTS (STA. 11+00 TO STA. 13+50)
15	FM5 FORCE MAIN IMPROVEMENTS (STA. 13+50 TO STA. 16+00)
16	FM6 FORCE MAIN IMPROVEMENTS (STA. 16+00 TO STA. 18+50)
17	FM7 FORCE MAIN IMPROVEMENTS (STA. 18+50 TO STA. 21+00)
18	FM8 FORCE MAIN IMPROVEMENTS (STA. 21+00 TO END)
19	LS1 PRIVATE LIFT STATION PLAN AND DETAIL
20	SD1 OFFSITE DRAINAGE IMPROVEMENTS (BEGIN TO STA. 21+00)
21	SD2 OFFSITE DRAINAGE IMPROVEMENTS (STA. 21+00 TO STA. 23+50)
22	SD3 OFFSITE DRAINAGE IMPROVEMENTS (STA. 23+50 TO END)
23	XS1 CROSS SECTION (STA. 19+00 TO STA. 21+50)
24	XS2 CROSS SECTION (STA. 22+00 TO 24+50)
25-26	R1-R2 RESTRAINT JOINT CALCULATION
27-30	D1-D4 DETAILS
31	SETPD SAFETY END TREATMENT DETAIL
32-33	TCP TRAFFIC CONTROL AND BARRICADES



PROJECT LOCATION MAP



PLEASE NOTE, NBU REQUIRES GPS POINTS FOR CERTAIN ELECTRIC, WATER AND WASTEWATER ATTRIBUTES, SOME OF WHICH MUST BE TAKEN PRIOR TO BACKFILL DURING CONSTRUCTION.

GPS POINTS SHALL BE REQUIRED FROM THE DEVELOPERS, CONTRACTOR, OR ENGINEER. A MINIMUM OF THREE COORDINATE POINTS FOR GEOREFERENCING SHALL BE REQUIRED. THE WATER AND WASTEWATER GPS POINTS SHALL BE TO SURVEY GRADE. THE ELECTRIC GPS POINTS SHALL BE TO MAP GRADE.

WATER
VERTICAL BENDS AND EDGE OF STEEL CASING (IF APPLICABLE) PRIOR TO BACKFILL
HORIZONTAL BENDS PRIOR TO BACKFILL
TEES PRIOR TO BACKFILL
FITTINGS (REDUCERS AND COUPLINGS) PRIOR TO BACKFILL
FIRE HYDRANTS (TOP OF FLANGE)
VALVES
METERS (TOP CENTER OF BOX)
BLOW OFF ASSEMBLY
CORNER SLAB OF WATER TANK & GATE VALVE ON WATER TANK

WASTEWATER
MANHOLES
CLEANOUTS
CORNER SLAB OF LIFT STATION

ELECTRIC
POLES
TRANSFORMERS, BOTH ABOVE AND UNDERGROUND (FRONT LOCK)
PULL BOXES
STREET LIGHTS

COORDINATE GPS REQUIREMENTS WITH NBU INSPECTOR

PROJECT INFORMATION:

OWNER:
ANGEL BROTHERS ENTERPRISES, LTD.
723 KRUEGER CANYON
NEW BRAUNFELS, TX 78132

CONTACT:
MR. MIKE PRUITT
PH: (830) 643-0570

SUBMITTAL PREPARED BY:

HEJL, LEE & ASSOCIATES, INC.
206 TAYLOR STREET
HUITO, TX 78634
(512) 642-3292

SUBMITTED FOR APPROVAL BY:



ENGINEER OF RECORD - EFFENDY, P.E.

1-31-2019

DATE

ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN ACCEPTING THESE PLANS, THE GOVERNING ENTITY MUST RELY ON THE ADEQUACY OF THE DESIGN ENGINEER.

APPROVED BY:

NEW BRAUNFELS UTILITY DATE

CITY OF NEW BRAUNFELS DATE

UNION PACIFIC RAILROAD DATE

HEJL, LEE & ASSOCIATES, INC.

ENGINEERING • SURVEYING • PLANNING

TBPE FIRM NO. F-755, TBPLS FIRM NO. 10058500
206 TAYLOR STREET, HUITO, TEXAS 78634
Ph: (512) 642-3292

UPDATED: 1-31-2019

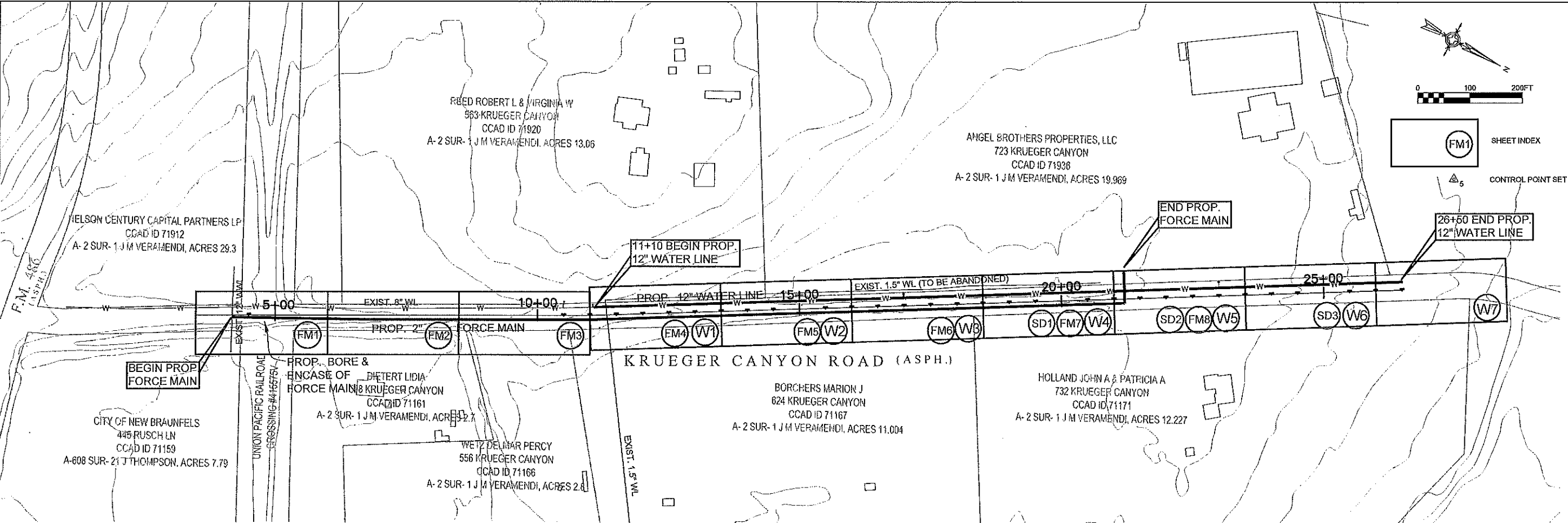
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PROJECT NO. P17-11-05

FND

NBU # W-155324 & WW-155325

ANGEL BROTHERS OFFSITE W&WW IMPROVEMENTS



NEW BRAUNFELS UTILITIES GENERAL CONSTRUCTION NOTES

1. All materials and construction procedures within the scope of the project shall be approved by New Braunfels Utilities and comply with the current "New Braunfels Utilities Water Systems Connection/Construction policies Water Systems".

2. Contractor shall not proceed with any pipe installation work until they obtain a copy of the plans from the Consultant or Engineer and notify NBU Water Systems Engineering at 830-608-8971 with at least three (3) working days (72 hours) notice. WORK COMPLETED BY THE CONTRACTOR, WHICH HAS NOT RECEIVED A NOTICE TO PROCEED WITH NEW BRAUNFELS UTILITIES WATER SYSTEMS ENGINEERING WILL BE SUBJECT TO REMOVAL AND REPLACEMENT BY AND AT THE EXPENSE OF THE CONTRACTOR.

3. The Developer dedicates the water / wastewater mains upon completion by the Developer and acceptance by the New Braunfels Utilities Water System. NBU will own and maintain said water / wastewater mains which are located within said particular subdivision. (As applicable).

4. Contractor agrees to assume sole and complete responsibility for job site conditions during the construction of the project, including safety of all persons and property. This requirement shall apply continuously and not be limited to normal working hours. The contractor shall defend, indemnify and hold the owners and the engineer and his employees, partners officers, directors, or consultants harmless from any and all liability, real or alleged, in connection with the performance of the work on this project, excepting from liability arising from sole negligence of the owner or engineer, engineer's directors, officers, employees, or consultants.

5. Contractor and / or contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA standards governing the presence and activities of individuals working in and around trench excavation.

6. Contractor shall be responsible for restoring to its original or better condition, any damages done to existing fences, curbs, streets, driveways, landscaping and structures, and existing utilities (not adjusted on plans). Cost of Restorations, if any, shall be the contractor's entire expense.
7. The Contractor shall avoid cutting roots larger than one inch in diameter when excavating near existing trees. Excavation in vicinity of trees shall proceed with caution.

8. Contractor shall procure all permits and licenses, pay all charges, fees and taxes and give all notices necessary and incidental to the due and lawful prosecution of the work.

9. No extra payment shall be allowed for work called for on the plans but not included on the bid schedule. This incidental work will be required and shall be included under the pay item to which it relates.

10. Contractor is responsible for removal of all waste materials upon project completion. The contractor shall not permanently place any waste materials in the 100-year flood plain without first obtaining an approved flood plain development permit.

11. The contractor shall not place any materials on the recharge zone of the Edwards aquifer without an approved water pollution abatement plan from the TCEQ 31 TAC 313.4 and 31 TAC 313.9.

12. Barricades and warning signs shall conform to the "Texas manual on uniform traffic control devices" and shall be located to provide maximum protection to the public as well as construction personnel and equipment while providing continuous traffic flow at all times during construction. The contractor is responsible for maintaining all devices during construction.

13. Contractor is required to verify project elevations. The term "match existing" shall be understood to signify both horizontal and vertical alignment.

14. The location of utilities, either underground or overhead, shown within the right of way are approximate and shall be verified by the contractor before beginning construction operations.

15. OSHA regulations prohibit operations that will bring persons or equipment within 10 feet of an energized line. Where workmen and/or equipment have to work close to an energized electrical line, the contractor shall notify the electrical power company involved and make whatever adjustments necessary to ensure the safety of those workmen.

16. It shall be the contractor's responsibility to locate utility service lines as required for construction. Utility companies are also previously mentioned in "Utility Company Notification".

17. Due to federal regulations Title 49, part 192 (8), Gas companies must maintain access to gas valves at all times. The contractor must protect and work around any gas valves that are in the project area.

18. The contractor is fully responsible for the traffic control and will
- be responsible for furnishing all traffic control devices, and flaggers. The construction methods shall be conducted to provide the least possible interference to traffic so as to permit the continuous movement of the traffic in one direction at all times. The contractor shall clean up and remove from the work area any loose material resulting from contract operations at the end of each workday.

19. Prior to ordering materials to be used in construction, contractor shall provide the engineer with four (4) copies of the source, type, gradation, material specification data and / or shop drawings, as applicable, to satisfy the requirements of the following items and all material items referred to in these listed items:

a. Water mains and services

b. Sewer mains and services

20. No meter boxes to be set in driveways. Any meter boxes set in driveways will be relocated at contractor's and/or developer's expense.

21. Where the minimum 9 foot separation distance between sewer lines and water lines / mains cannot be maintained, the installation of sewer lines shall be in strict accordance with TCEQ.

22. Contractor and/or Contractor's independently retained employee or structural design/geotechnical/safety/equipment consultant, if any, shall review these plans and available geotechnical information and the anticipated installation site(s) within the project work area in order to implement Contractor's trench excavation safety protection systems, programs and/or procedures. The Contractor's implementation of the systems, programs and/or procedures shall provide for adequate trench excavation safety protection that complies with as a minimum, OSHA Standards for trench excavations. Specifically, Contractor and/or Contractor's independently retained employee or safety consultant shall implement a trench safety program in accordance with OSHA Standards governing the presence and activities of individuals working in and around trench excavation.

23. Utility Trench Compaction with street R.O.W.

a. All utility trench compaction test within the street pavement
- section shall be the responsibility of the developer's Geo-technical engineer.

b. Fill material shall be placed in uniform layers not to exceed twelve inches (12") loose.

c. Each layer of material shall be compacted as specified and tested for density and moisture in accordance with Text Methods TEX-113-E, TEX-114-E, TEX-115-E.

d. The number and location of required tests shall be determined by the Geo-technical Engineer and approved by the City of New Braunfels Street Inspector.

e. Upon completion of testing the Geo-technical Engineer shall provide the City of New Braunfels Street inspector with all testing documentation and a certification stating that the placement of fill material has been completed in accordance with the plans.

CONSTRUCTION SUMMARY TABLE

TYPE	QUANTITY	MAINTAINED BY
WATER MAIN	1,540 LF 12" PVC	NBU
FIRE HYDRANT	5	NBU
WATER SERVICE	ONE 3" METER	NBU
FORCE MAIN	1,700 LF 2" PVC	PRIVATE
WW MANHOLE	1	PRIVATE
WW SERVICE	1	PRIVATE
LUE	8	N/A

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ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292
TBP# FIRM NO. F-755, TBP# FIRM NO. 10058500

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-31-19
SCALE: AS SHOWN
DWG. NO. 2

OVERALL MAP & NOTES

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS

1/31/19

NO. DR. CK. DATE DESCRIPTION REVISIONS

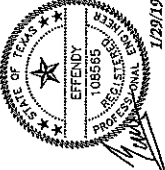
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WASTEWATER NOTES:

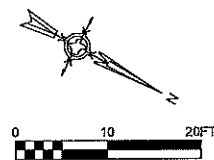
1. The contractor shall maintain service to existing sanitary sewers at all times during construction.
2. Due to Federal Regulations Title 49, Part 192.181, Reliant Energy must maintain access to gas valves at all times. The Contractor must protect and work around gas valves that are in the project areas.
3. All 8" sewer pipe and fittings in this project are P.V.C. SDR-26, ASTM, D-3034, D-3212, F-477.
4. All residential sewer service laterals shall be extended to the property line and capped and sealed.
5. Initial backfill of sewer lines shall be ¾" to dust or pea gravel as per NBU specifications.
6. Secondary backfill of sewer lines shall generally consist of materials removed from the trench and shall be free from brush, debris and trash, no rocks or stones having any dimension larger than 6 inches at the largest dimension.
7. All sewer pipes shall have compression or mechanical joints as per 31 TAC 313.5 (c)(2)(ii).
8. For sewer lines less than 24" in diameter, select initial backfill material shall be placed in two lifts.
 - a. The first lift shall be spread uniformly and simultaneously on each side and under the shoulders of the pipe to the mid point or spring line of the pipe.
 - b. The second lift shall be placed to a depth as shown on the pipe backfill detail. For pipes larger than 24", 12" maximum lifts shall be used.
9. All manholes must be water tight, either monolithic, cast-in-place concrete structures or prefabricated manholes specifically approved by NBU. The manholes shall have water-tight rings and covers. Wherever they are within the 100 year floodplain, the manhole covers shall be bolted. Every fourth manhole in sequence shall have an alternate means of venting. 31 TAC 313.5 (c) (1) and 31 TAC 317.2 (c) (5)(f).
10. All manholes shall be constructed so that the top of the ring is surrounding ground except when located in paved area. In paved areas, the manhole ring shall be flush with pavement.
11. All new manholes are to have covers with 32" openings.
12. Sewer pipe connections to pre-cast manholes will be compression joints or mechanical "boot type" joint as approved by NBU.
13. Sewer lines shall be tested from manhole to manhole.
14. In areas where a new sanitary sewer manhole is to be constructed over an existing sanitary sewer system, it shall be the contractor's responsibility to test the existing manholes before construction. After the proposed manhole(s) has been built, the contractor shall re-test the existing system to the satisfaction of the construction inspector. (no separate pay item).
15. Where the minimum 9 foot separation distance between sewer lines and water lines / mains cannot be maintained, the installation of sewer lines shall be in strict accordance with TCEQ. The wastewater line shall be constructed of cast iron, ductile iron or PVC meeting the ASTM specification for both pipes and joints of 150 psi and shall be in accordance with 30 TAC 290.44 (e)(5).
16. After construction, testing will be done by TV camera by the Contractor and observed by Inspector of Water Systems Engineering personnel as the camera is run through the lines. Any abnormalities found in the line, such as broken pipe or misaligned joints, must be replaced by the Contractor at his expense. Contractor to provide TV tapes to Construction Inspection for review prior to final inspection of the project.
17. Water jetting the backfill within a street will not be permitted. Sanitary sewer trenches subject to traffic shall conform to NBU Connection & Construction Policy Manual.
18. No testing will be performed prior to 30 days from complete installation of the sanitary sewer lines. The following sequence will be strictly adhered to:
 - a. Pull mandrel
 - b. Perform Air test
19. Where required, concrete encasement shall be placed as shown on the standard detail sheet.
20. A minimum of 3 feet of cover is to be maintained over the sanitary sewer main and laterals at subgrade, otherwise concrete encasement will be required.
21. Sanitary sewer main connections made directly to existing manholes will require successful testing of the manhole in accordance with NBU Connection & Construction Policy Manual.
22. TCEQ and EPA require erosion and sedimentation control for construction of sewer collection systems. Developer or authorized representative shall provide erosion and sedimentation control as notes on the project's plan and profile sheets. All temporary erosion and sedimentation controls shall be removed by the Contractor at final acceptance of the project by NBU Water Systems.
23. All manholes not within paved streets shall have locking concrete collar to secure ring and cover to manhole cone per NBU Detail drawing #329.
24. All manholes over the Edwards Aquifer Recharge Zone shall have locking concrete collar to secure ring and cover to manhole cone per NBU detail drawing #329.
25. All sewer services shall have cleanout installed at property line per NBU detail drawing #302 and #303.

WATER NOTES:

1. All water mains shall be AWWA C900.
2. Water services shall be single 1" copper tubing.
3. Water line is to be constructed in accordance with the NBU water line specifications.
4. Water main shall have a minimum of 42 inches of cover.
5. Contractor will keep the area on top of and around the water meter box free of all objects and debris.
6. Initial backfill of water lines shall be ¾" to dust or pea gravel as per NBU specifications.
7. Secondary backfill of water lines shall generally consist of material removed from the trench and shall be free from brush, debris and trash or stones having any dimension larger than 6" inches at the largest dimension.

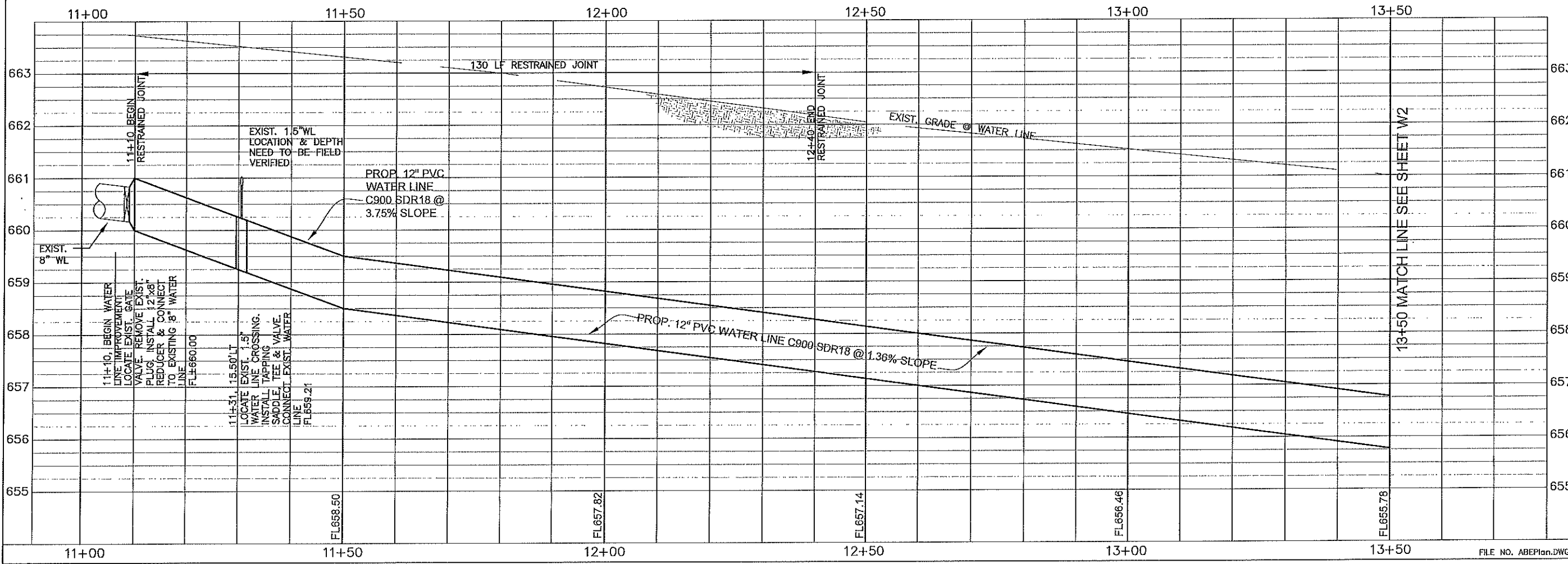
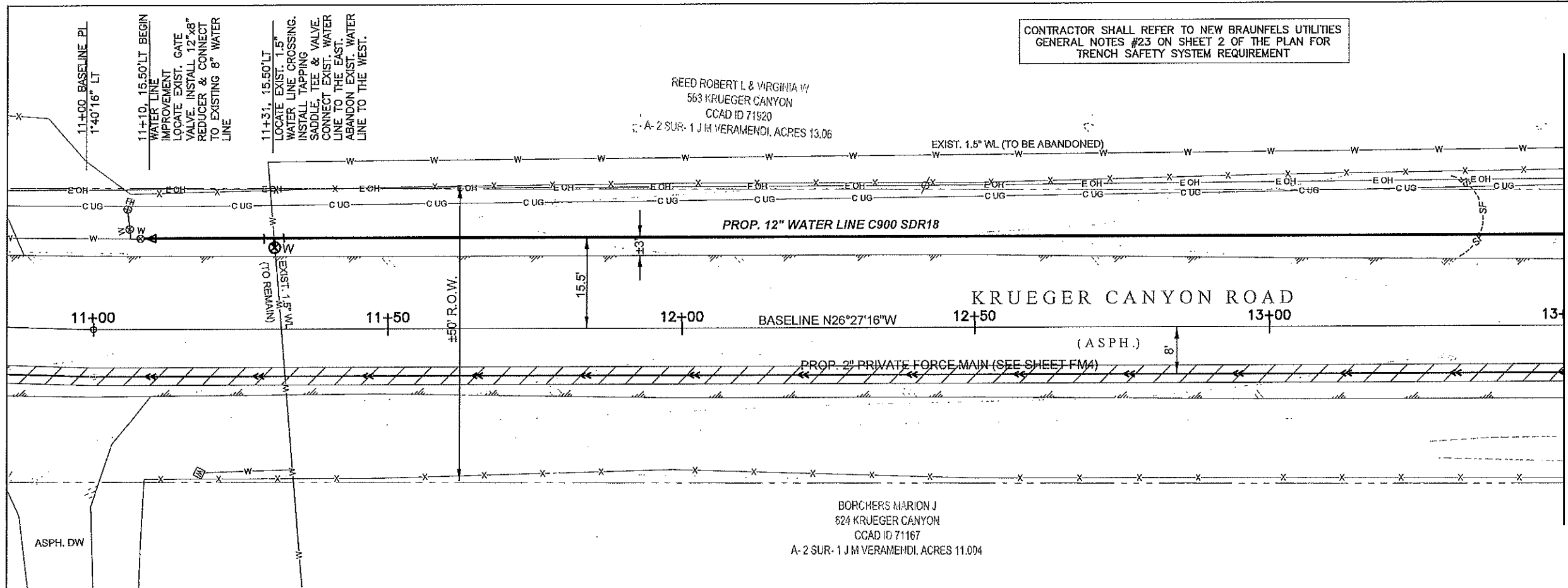
HEJL, LEE & ASSOCIATES, INC.	ENGINEERING - SURVEYING - PLANNING	206 TAYLOR STREET HOUSTON, TX 78634 Ph: (512) 642-3292	TYPE FIRM NO. 10058500
			
ANGEL BROTHERS ENTERPRISES NEW BRAUNFELS OFFICE WATER & WASTEWATER IMPROVEMENTS			
NOTES			
DESIGNED BY:	FND		
DRAWN BY:	FND		
REVIEWED BY:	CL		
APPROVED BY:	DPH		
PROJECT NO.:	P171105		
DATE:	1-29-19		
SCALE:	AS SHOWN		
DWG. NO.	3		
SHEET - OF -			

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES
GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR
TRENCH SAFETY SYSTEM REQUIREMENT



LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
- IRON PIPE FOUND
- IRON ROD FOUND
- MONUMENT FOUND
- EXIST. CONTOUR
- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
- EXIST. UNDERGROUND FIBER OPTIC
- EXIST. OVERHEAD ELECTRIC
- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. SILT FENCE
- PROP. TREE PROTECTION



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TYPE FIRM NO. F-755, TPL'S FIRM NO. 10058500

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
12" OFFSITE WATER LINE IMPROVEMENTS
BEGIN TO STA. 13+50

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-30-19
SCALE: AS SHOWN
DWG. NO. W1

SHEET - OF -



Angel Brothers
Enterprises, Ltd.

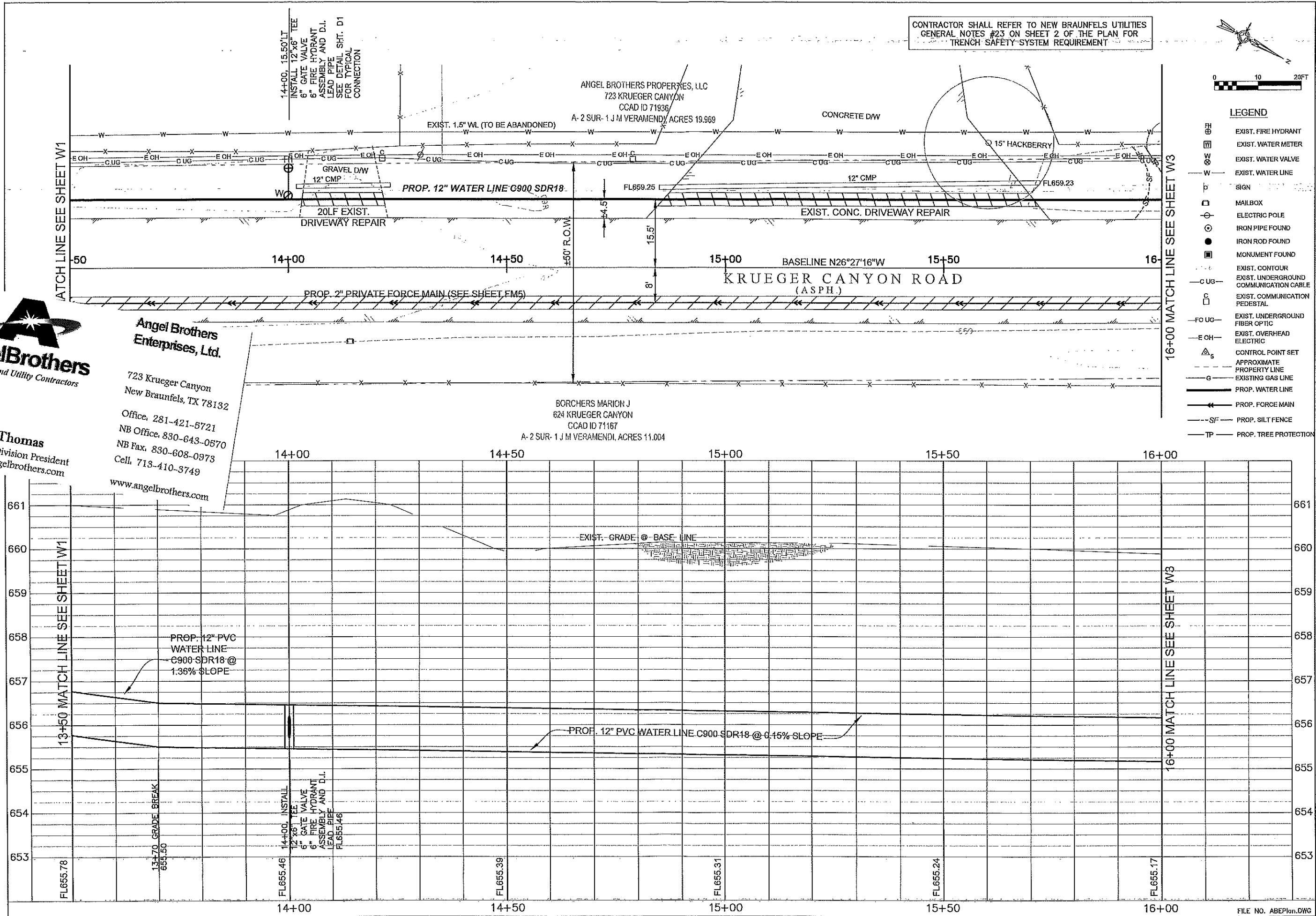
723 Krueger Canyon
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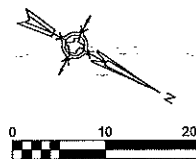
www.angelbrothers.com

Bill Thomas

Hill Country Division President
bthomas@angelbrothers.com



CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES
GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR
TRENCH SAFETY SYSTEM REQUIREMENT



LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
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- IRON ROD FOUND
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- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
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- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. SILT FENCE
- PROP. TREE PROTECTION

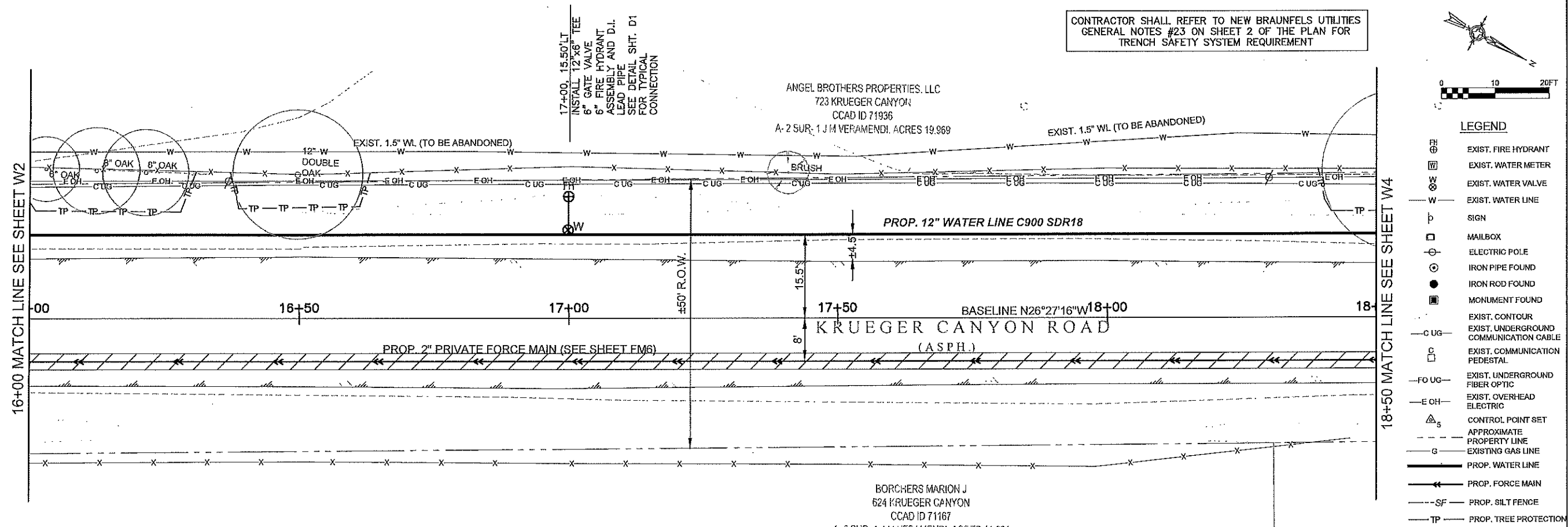
REVISIONS	
NO.	DESCRIPTION

HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292
TYPE FIRM NO. F-755, TEPUS FIRM NO. 10058500

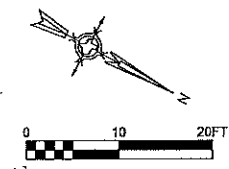
ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
12" OFFSITE WATER LINE IMPROVEMENTS
STA. 13+50 TO STA. 16+00

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. W2

SHEET - OF -

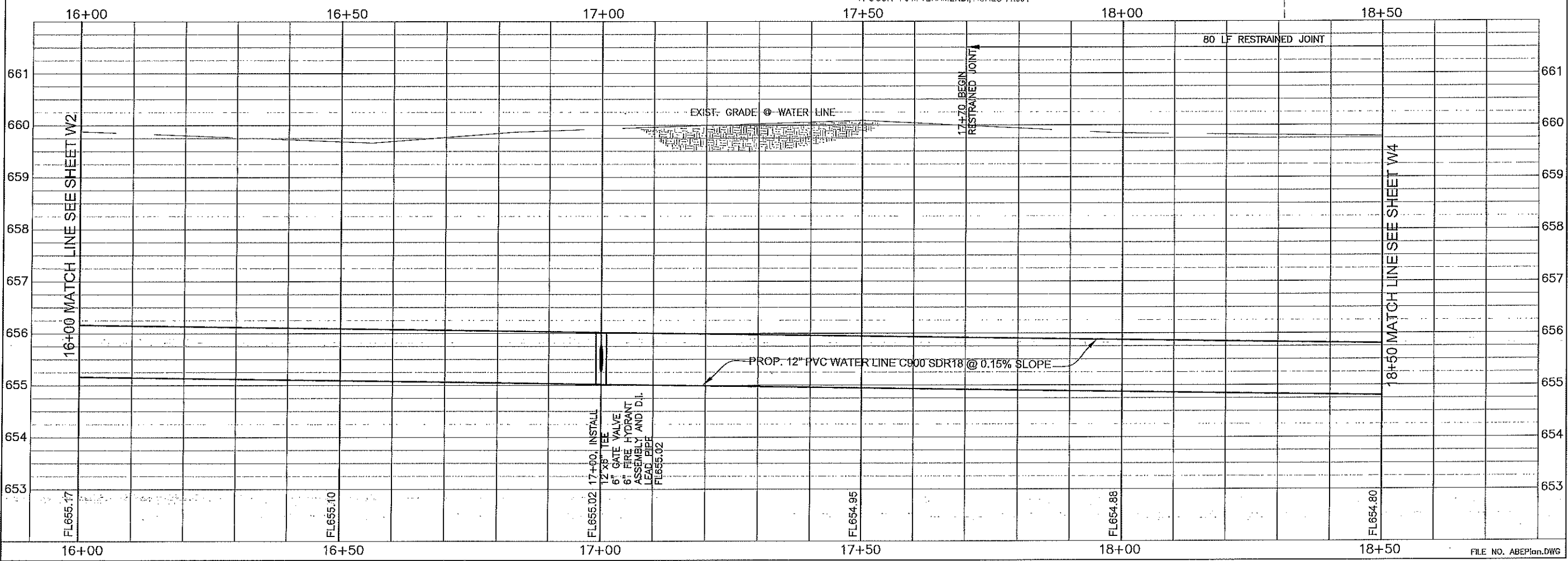


CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES
GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR
TRENCH SAFETY SYSTEM REQUIREMENT



LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
- IRON PIPE FOUND
- IRON ROD FOUND
- MONUMENT FOUND
- EXIST. CONTOUR
- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
- EXIST. UNDERGROUND FIBER OPTIC
- EXIST. OVERHEAD ELECTRIC
- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. SILT FENCE
- PROP. TREE PROTECTION

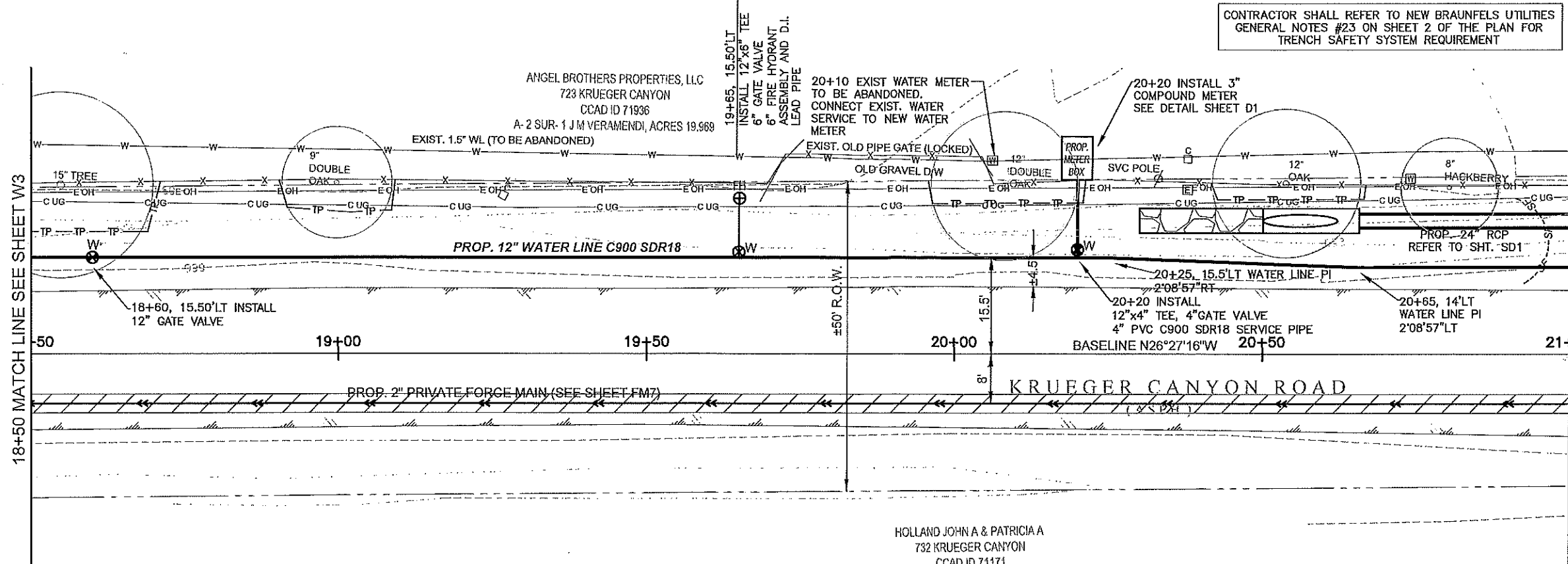


HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292
TYPE FIRM NO. F-755, TPLS FIRM NO. 10058500

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
12" OFFSITE WATER LINE IMPROVEMENTS
STA. 16+00 TO STA. 18+50

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. W3

SHEET - OF -



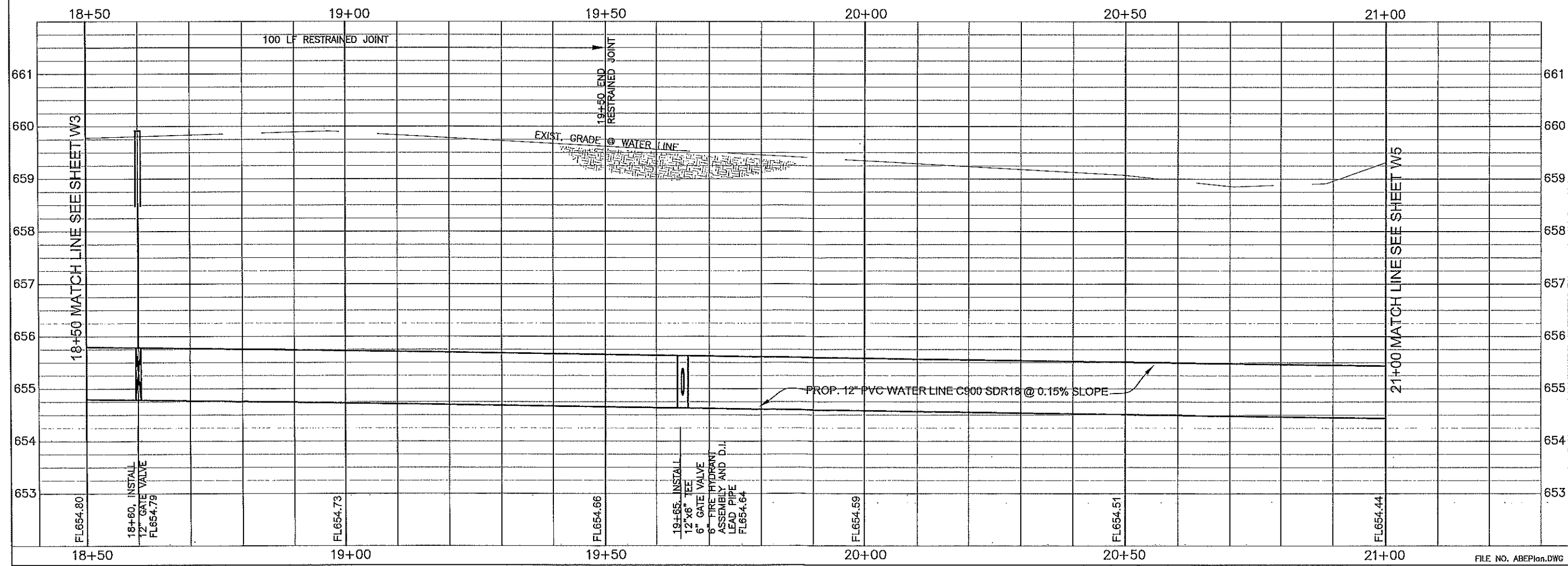
0 10 20 FT

LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
- IRON PIPE FOUND
- IRON ROD FOUND
- MONUMENT FOUND
- EXIST. CONTOUR
- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
- EXIST. UNDERGROUND FIBER OPTIC
- EXIST. OVERHEAD ELECTRIC
- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. SILT FENCE
- PROP. TREE PROTECTION

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR TRENCH SAFETY SYSTEM REQUIREMENT

HOLLAND JOHN A & PATRICIA A
732 KRUEGER CANYON
CCAD ID 71171
A-2 SUR-1 J M VERAMENDI, ACRES 12.227



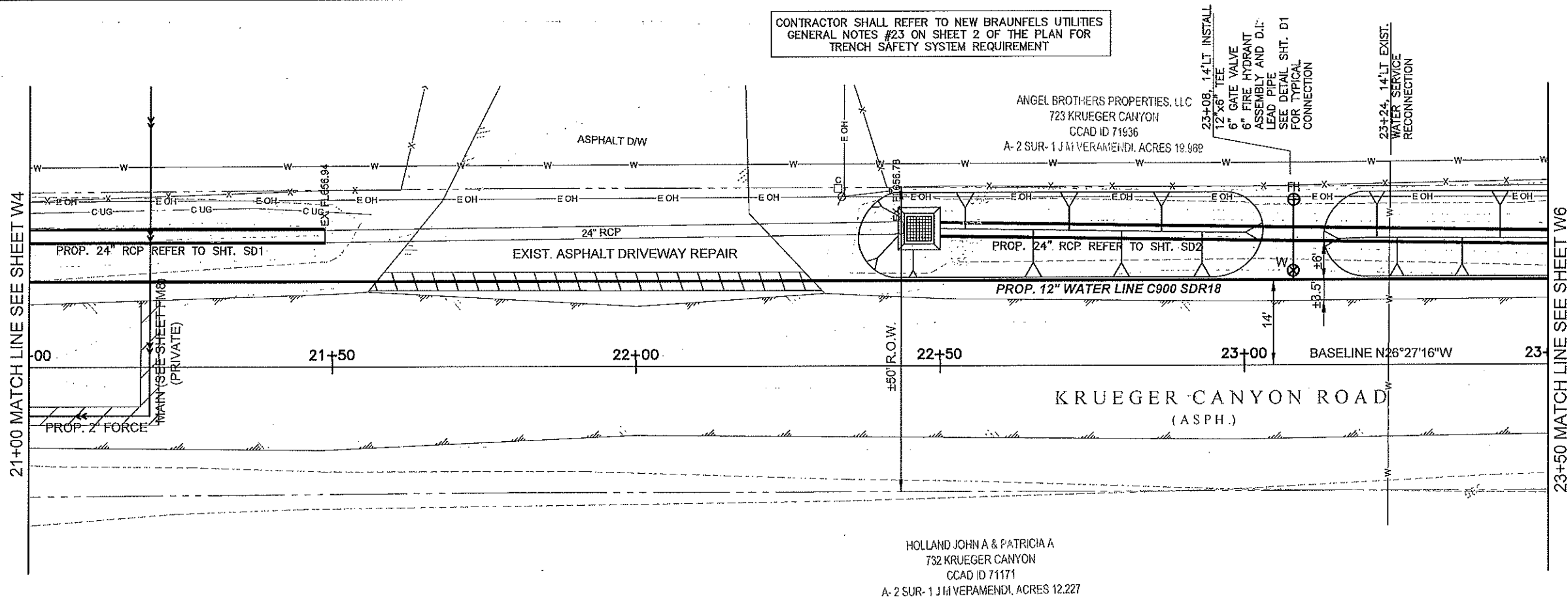
HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
Ph: (512) 642-3292
TXBE FIRM NO. F-755, TEPUS FIRM NO. 10058500

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
12" OFFSITE WATER LINE IMPROVEMENTS
STA. 18+50 TO STA. 21+00

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-31-19
SCALE: AS SHOWN
DWG. NO. **W4**

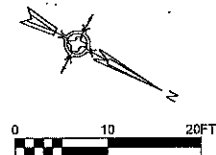
SHEET - OF -

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES
GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR
TRENCH SAFETY SYSTEM REQUIREMENT



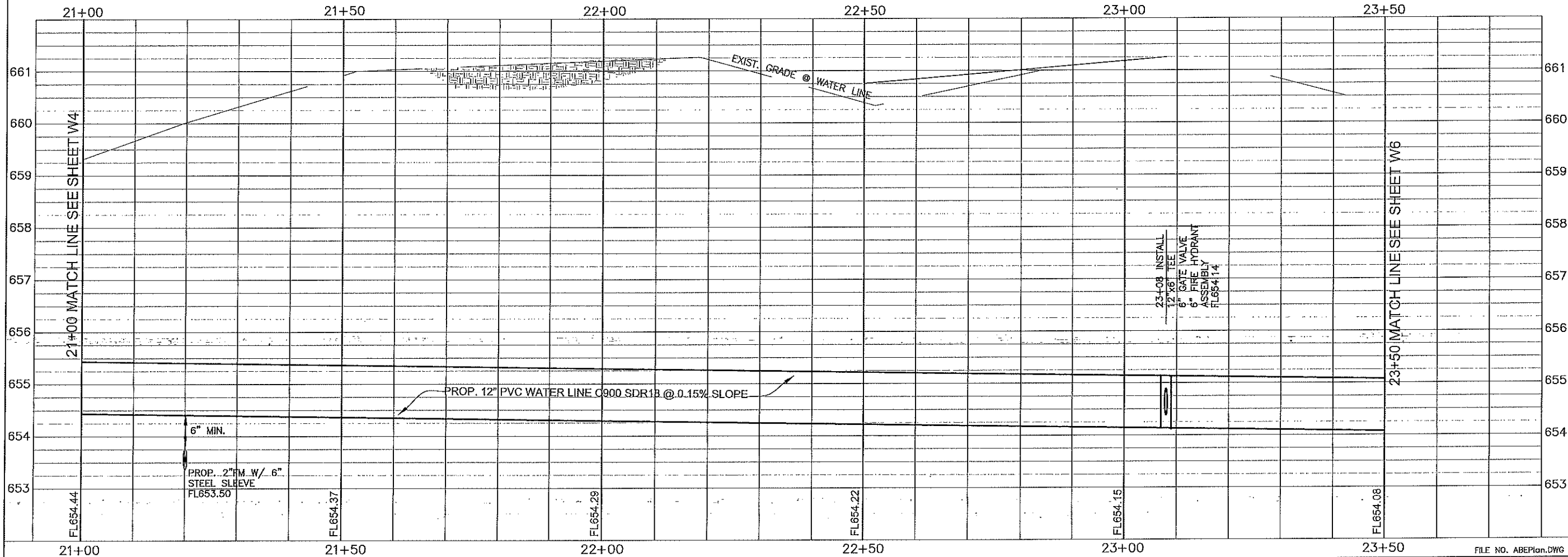
21+00 MATCH LINE SEE SHEET W4

23+50 MATCH LINE SEE SHEET W6



LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
- IRON PIPE FOUND
- IRON ROD FOUND
- MONUMENT FOUND
- EXIST. CONTOUR
- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
- EXIST. UNDERGROUND FIBER OPTIC
- EXIST. OVERHEAD ELECTRIC
- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. SILT FENCE
- PROP. TREE PROTECTION



21+00 MATCH LINE SEE SHEET W4

23+50 MATCH LINE SEE SHEET W6

HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
Ph: (512) 642-3292

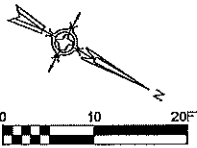


ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
12" OFFSITE WATER LINE IMPROVEMENTS
STA. 21+00 TO STA. 23+50

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-31-19
SCALE: AS SHOWN
DWG. NO. W5

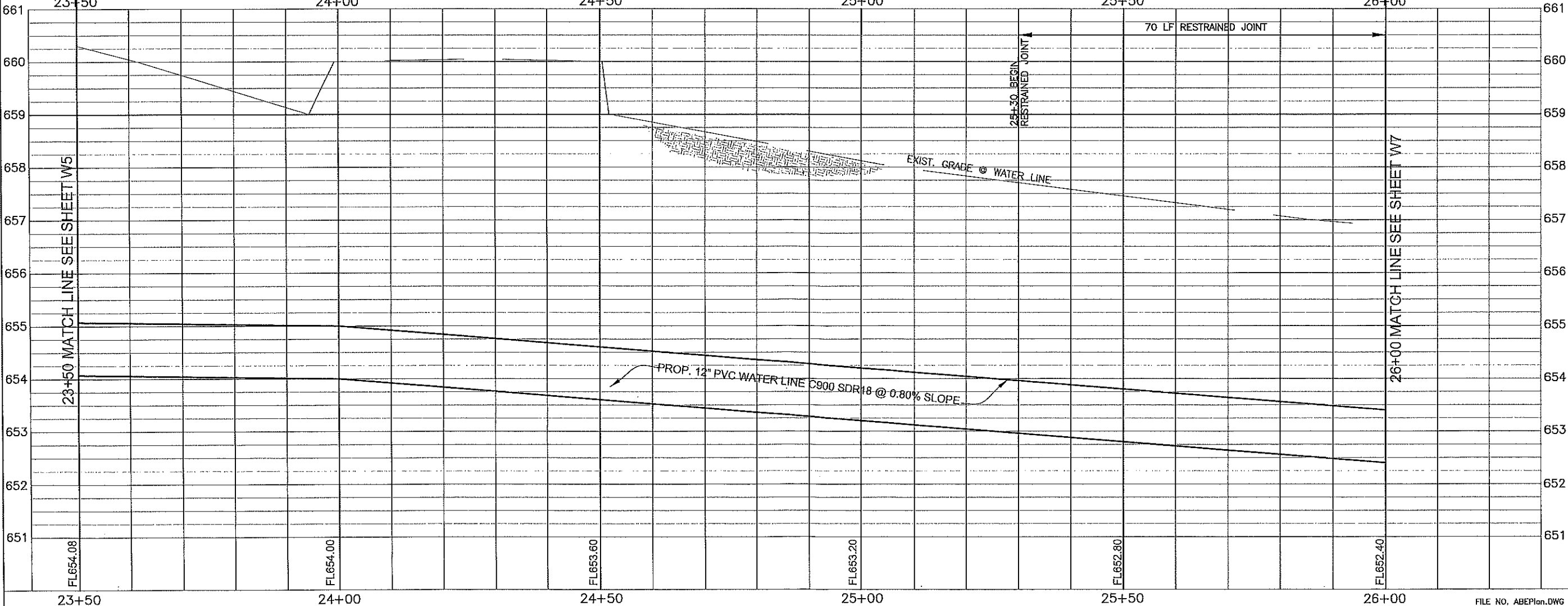
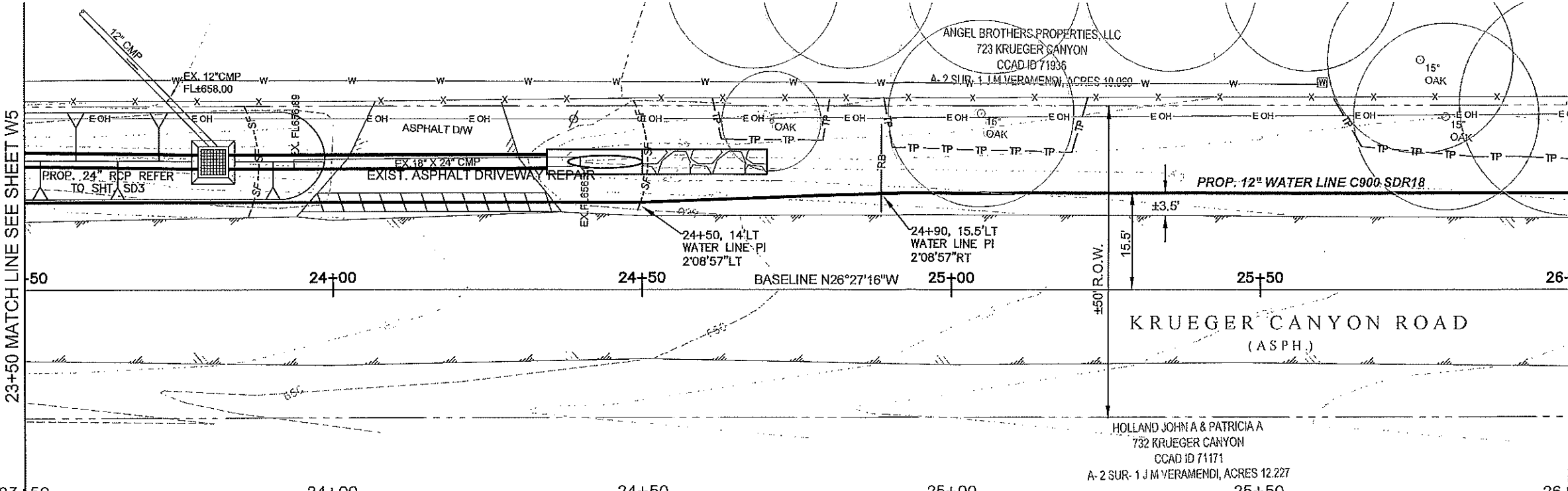
SHEET - OF -

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES
GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR
TRENCH SAFETY SYSTEM REQUIREMENT



LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
- IRON PIPE FOUND
- IRON ROD FOUND
- MONUMENT FOUND
- EXIST. CONTOUR
- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
- FO UG
- EXIST. UNDERGROUND FIBER OPTIC
- EXIST. OVERHEAD ELECTRIC
- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. SILT FENCE
- TP
- PROP. TREE PROTECTION



HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292
TXPE FIRM NO. F-755, TEPLS FIRM NO. 10056500
1/29/19

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
12" OFFSITE WATER LINE IMPROVEMENTS
STA. 23+50 TO 26+00

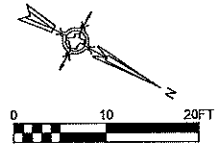
DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. **W6**

REVISIONS

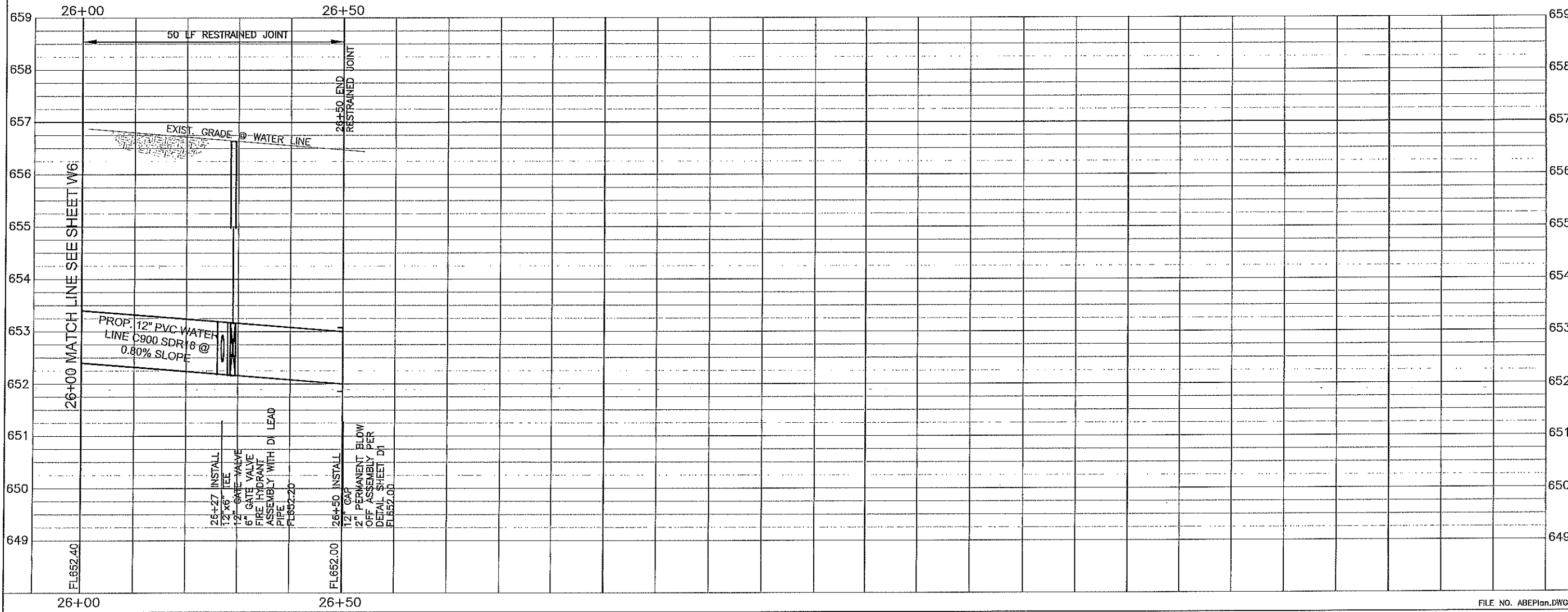
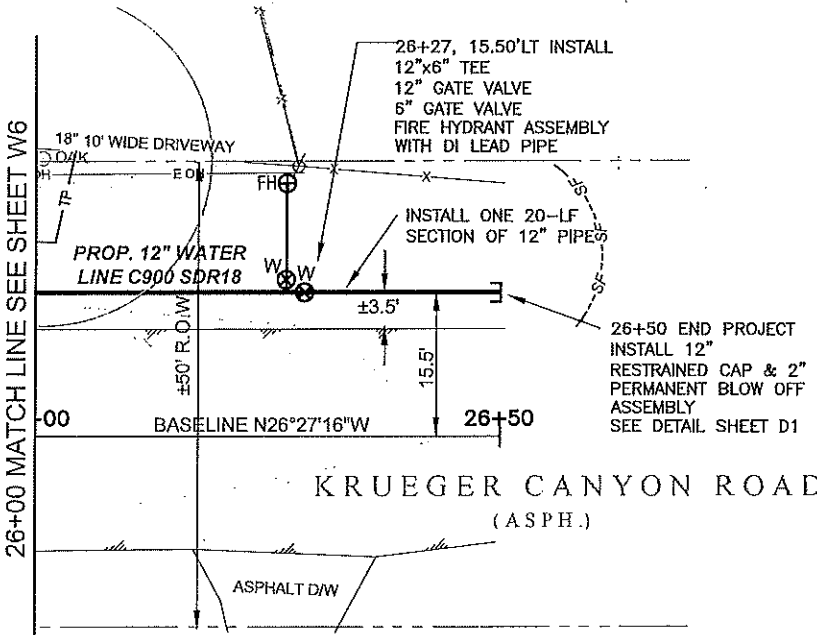
NO. DR. CK. DATE DESCRIPTION

SHEET - OF -

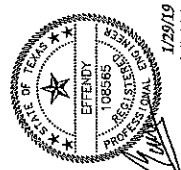
CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES
GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR
TRENCH SAFETY SYSTEM REQUIREMENT



- LEGEND**
- ⊕ EXIST. FIRE HYDRANT
 - ⊕ EXIST. WATER METER
 - ⊕ EXIST. WATER VALVE
 - W— EXIST. WATER LINE
 - ⊕ SIGN
 - ⊕ MAILBOX
 - ⊕ ELECTRIC POLE
 - ⊕ IRON PIPE FOUND
 - ⊕ IRON ROD FOUND
 - ⊕ MONUMENT FOUND
 - EXIST. CONTOUR
 - CUG--- EXIST. UNDERGROUND COMMUNICATION CABLE
 - ⊕ EXIST. COMMUNICATION PEDESTAL
 - FOUG--- EXIST. UNDERGROUND FIBER OPTIC
 - EOH--- EXIST. OVERHEAD ELECTRIC
 - ⊕ CONTROL POINT SET
 - APPROXIMATE PROPERTY LINE
 - G--- EXISTING GAS LINE
 - PROP. WATER LINE
 - PROP. FORCE MAIN
 - SF--- PROP. SILT FENCE
 - TP--- PROP. TREE PROTECTION

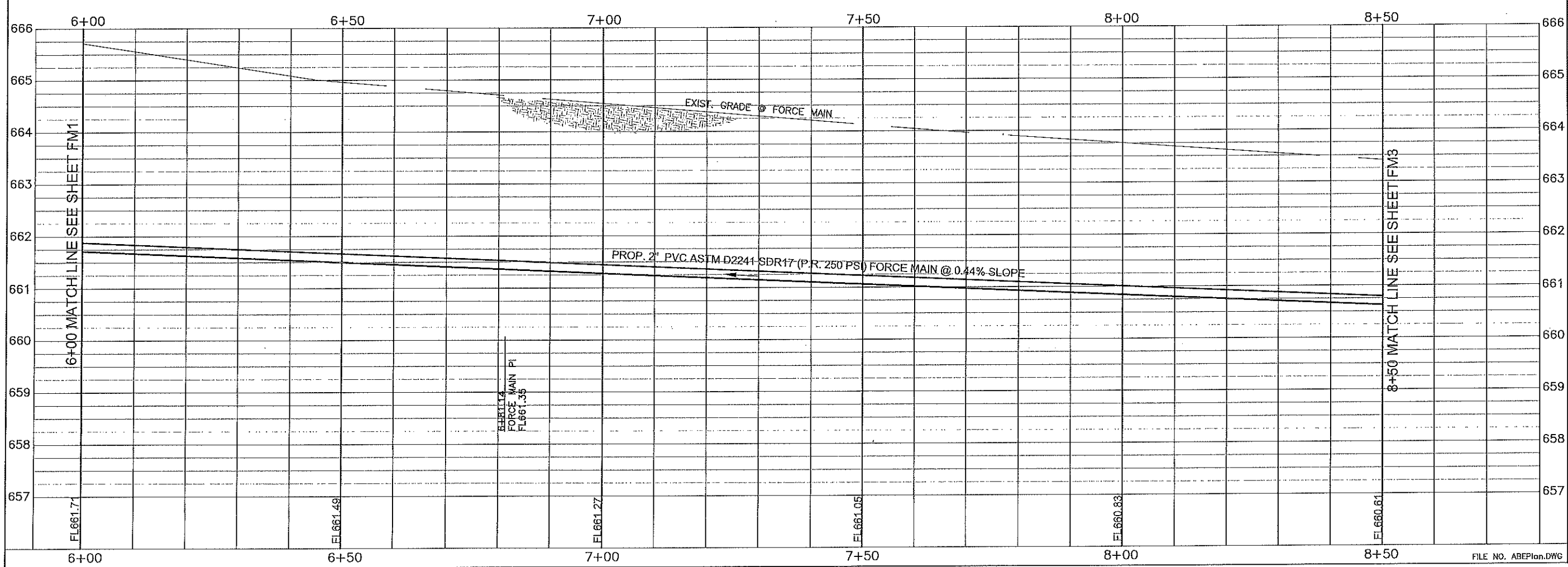
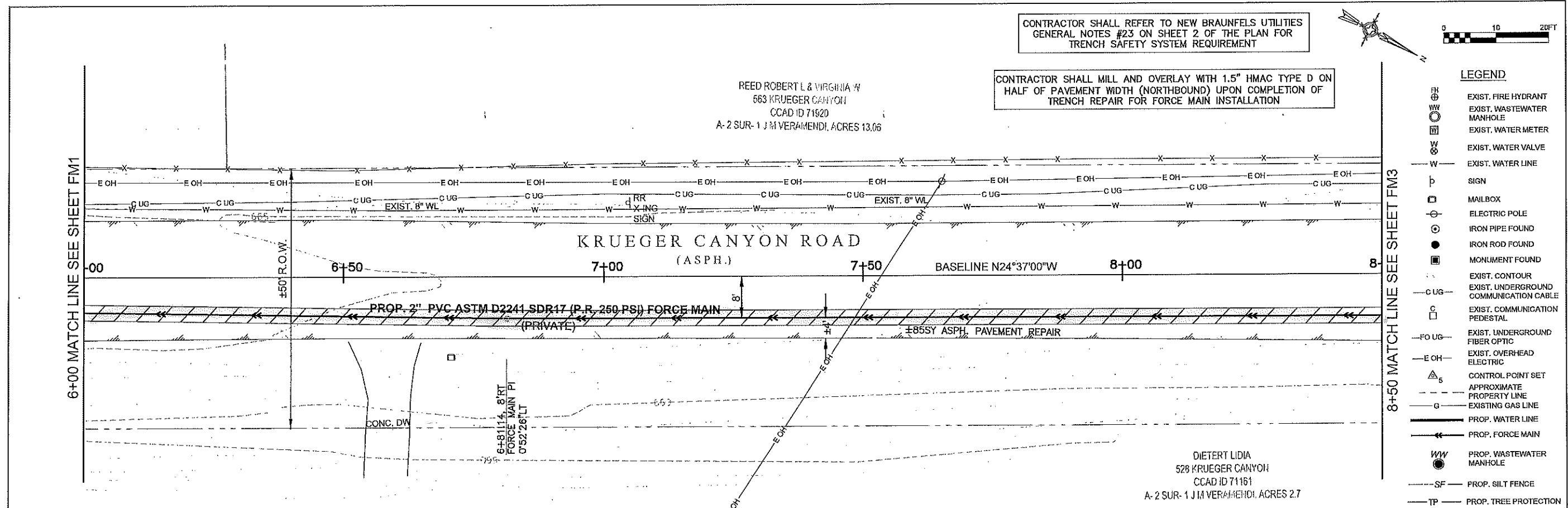


HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
Ph: (512) 642-3292
TBBE FIRM NO. F-755, TBBLS FIRM NO. 10058500



ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
12" OFFSITE WATER LINE IMPROVEMENTS
STA. 26+00 TO END

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. W7



HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292
FAX: (512) 642-3292
TYPE FIRM NO. F-755, TBL'S FIRM NO. 10056500

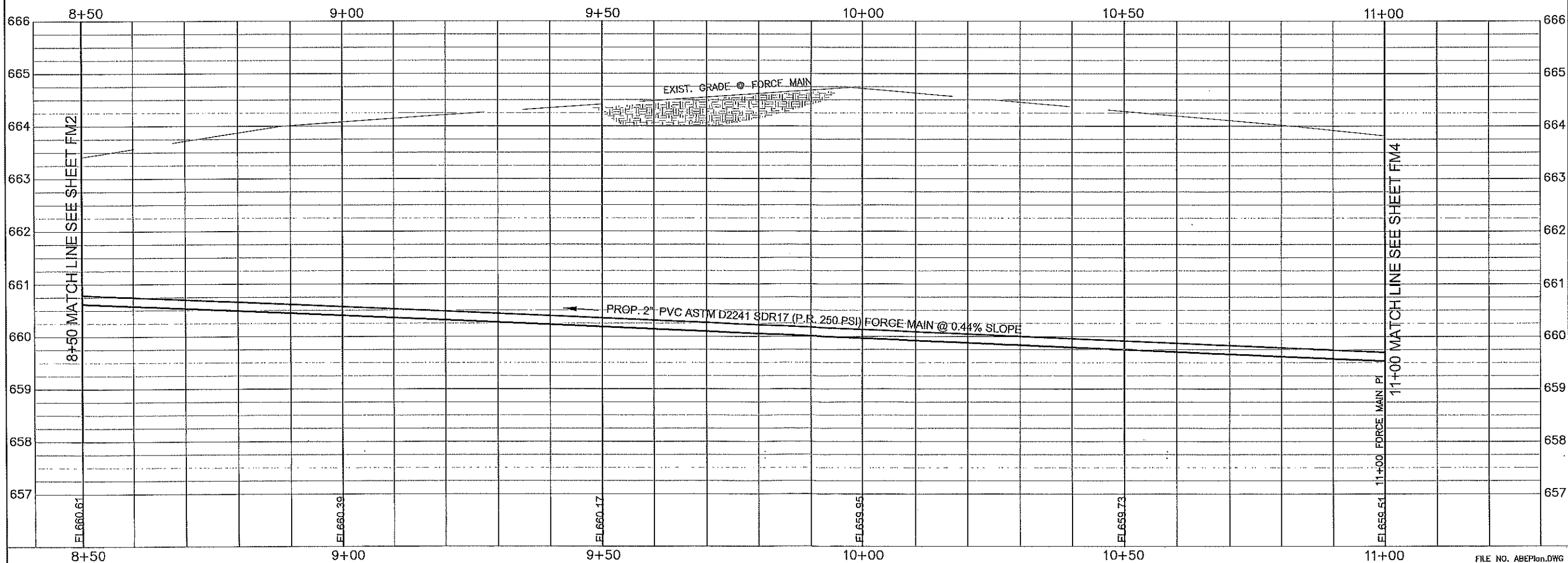
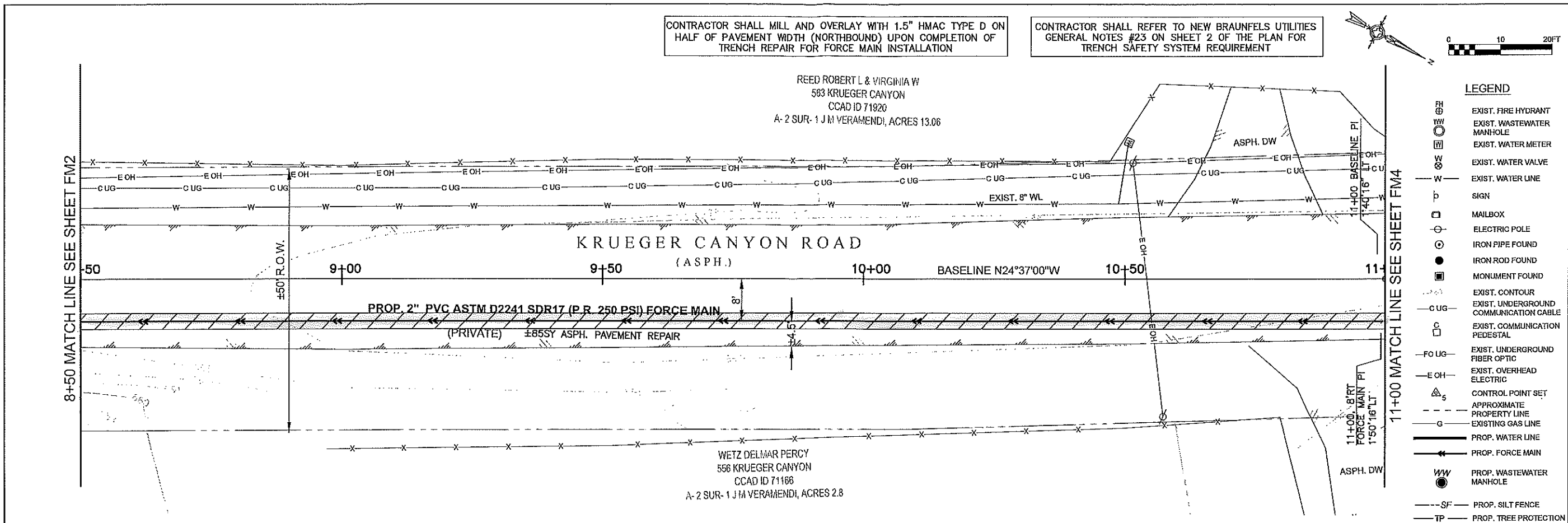
ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
2" OFFSITE FORCE MAIN IMPROVEMENTS
STA. 6+00 TO STA. 8+50

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. FM2
SHEET - OF -

FILE NO. ABEPlan.DWG

CONTRACTOR SHALL MILL AND OVERLAY WITH 1.5" HMA TYPE D ON HALF OF PAVEMENT WIDTH (NORTHBOUND) UPON COMPLETION OF TRENCH REPAIR FOR FORCE MAIN INSTALLATION

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR TRENCH SAFETY SYSTEM REQUIREMENT



HEIL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
Ph: (512) 642-3292
TBP# FIRM NO. F-755, TBP# FIRM NO. 10058500

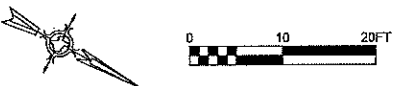
1/29/19

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
2" OFFSITE FORCE MAIN IMPROVEMENTS
STA. 8+50 TO STA. 11+00

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. FM3
SHEET - OF -

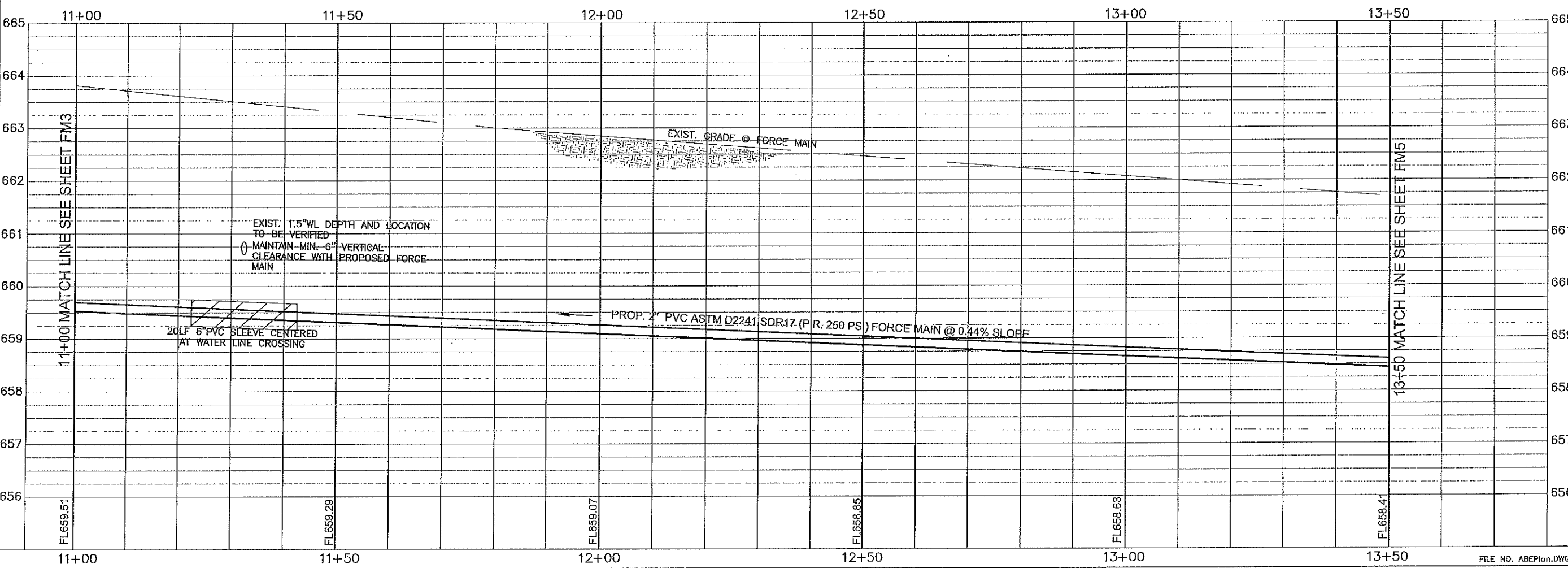
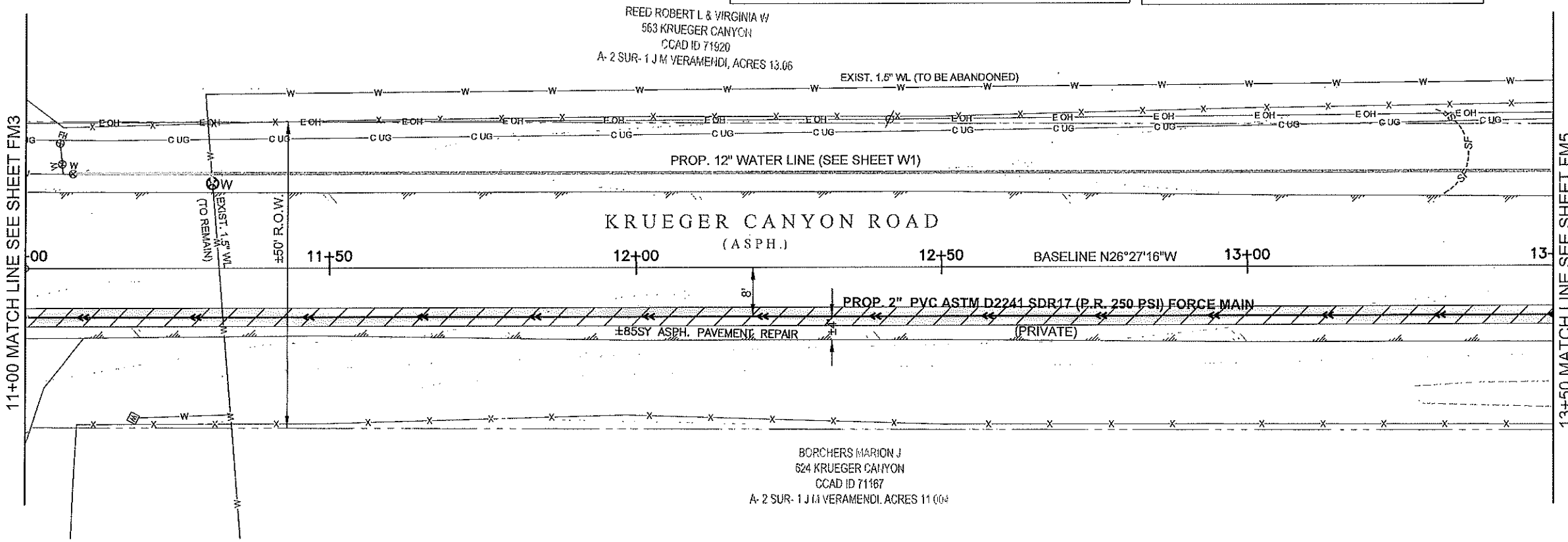
CONTRACTOR SHALL MILL AND OVERLAY WITH 1.5" HMAC TYPE D ON HALF OF PAVEMENT WIDTH (NORTHBOUND) UPON COMPLETION OF TRENCH REPAIR FOR FORCE MAIN INSTALLATION

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR TRENCH SAFETY SYSTEM REQUIREMENT

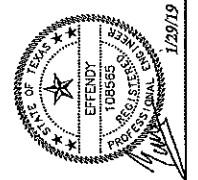


LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WASTEWATER MANHOLE
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
- IRON PIPE FOUND
- IRON ROD FOUND
- MONUMENT FOUND
- EXIST. CONTOUR
- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
- EXIST. UNDERGROUND FIBER OPTIC
- EXIST. OVERHEAD ELECTRIC
- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. WASTEWATER MANHOLE
- PROP. SILT FENCE
- PROP. TREE PROTECTION



HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292
TXBE FIRM NO. F-755, TBPLS FIRM NO. 10058500



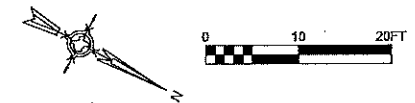
ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
2" OFFSITE FORCE MAIN IMPROVEMENTS
STA. 11+00 TO STA. 13+50

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. FM4
SHEET - OF -

CONTRACTOR SHALL MILL AND OVERLAY WITH 1.5" HMAC TYPE D ON HALF OF PAVEMENT WIDTH (NORTHBOUND) UPON COMPLETION OF TRENCH REPAIR FOR FORCE MAIN INSTALLATION

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR TRENCH SAFETY SYSTEM REQUIREMENT

ANGEL BROTHERS PROPERTIES, LLC
723 KRUEGER CANYON
CCAD ID 71936
A-2 SUR-1 J M VERANIENDI, ACRES 19.969



LEGEND

- EXIST. FIRE HYDRANT
- EXIST. WASTEWATER MANHOLE
- EXIST. WATER METER
- EXIST. WATER VALVE
- EXIST. WATER LINE
- SIGN
- MAILBOX
- ELECTRIC POLE
- IRON PIPE FOUND
- IRON ROD FOUND
- MONUMENT FOUND
- EXIST. CONTOUR
- EXIST. UNDERGROUND COMMUNICATION CABLE
- EXIST. COMMUNICATION PEDESTAL
- EXIST. UNDERGROUND FIBER OPTIC
- EXIST. OVERHEAD ELECTRIC
- CONTROL POINT SET
- APPROXIMATE PROPERTY LINE
- EXISTING GAS LINE
- PROP. WATER LINE
- PROP. FORCE MAIN
- PROP. WASTEWATER MANHOLE
- PROP. SILT FENCE
- PROP. TREE PROTECTION

16+00 MATCH LINE SEE SHEET FM5

18+50 MATCH LINE SEE SHEET FM7

KRUEGER CANYON ROAD

(ASPH.)

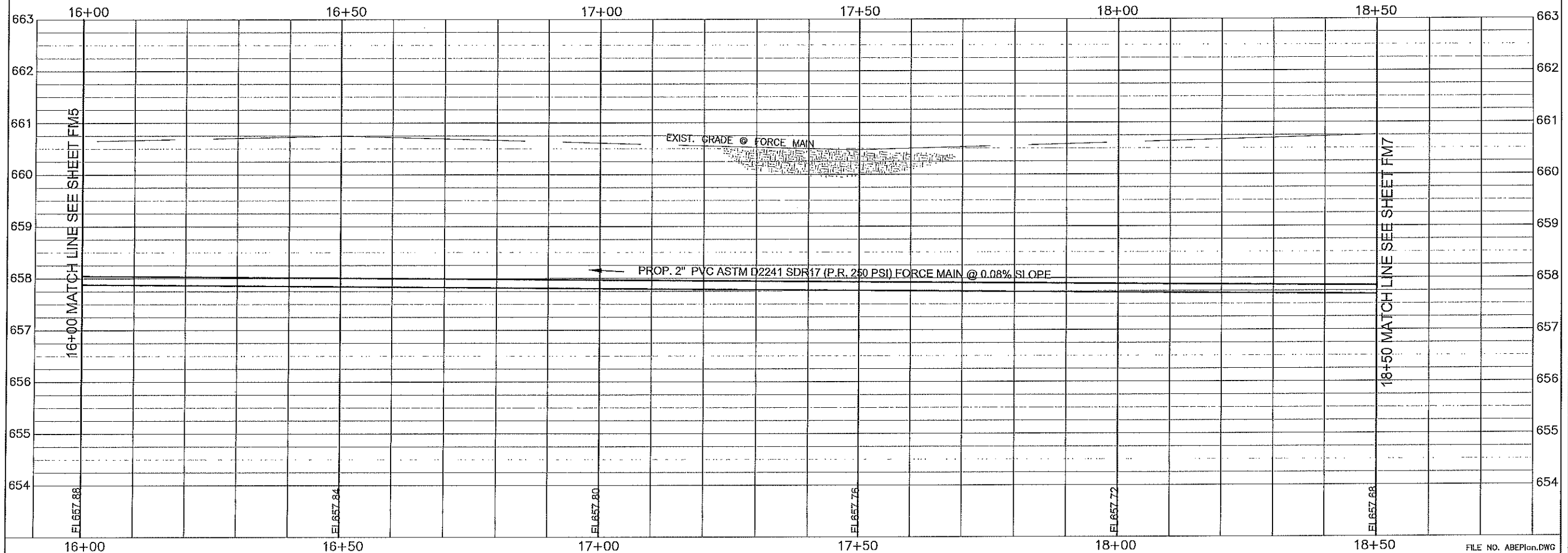
BASELINE N26°27'16"W

PROP. 2" PVC ASTM D2241 SDR17 (P.R. 250 PSI) FORCE MAIN
(PRIVATE)

±85SY ASPH. PAVEMENT REPAIR

BORCHERS MARION J
624 KRUEGER CANYON
CCAD ID 71167

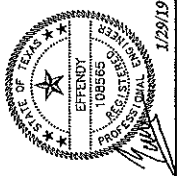
A-2 SUR-1 J M VERANIENDI, ACRES 11.004



FILE NO. ABEPlan.DWG

HEIL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292

TYPE FIRM NO. F-755, TPLS FIRM NO. 10058500



ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
2" OFFSITE FORCE MAIN IMPROVEMENTS
STA. 16+00 TO STA. 18+50

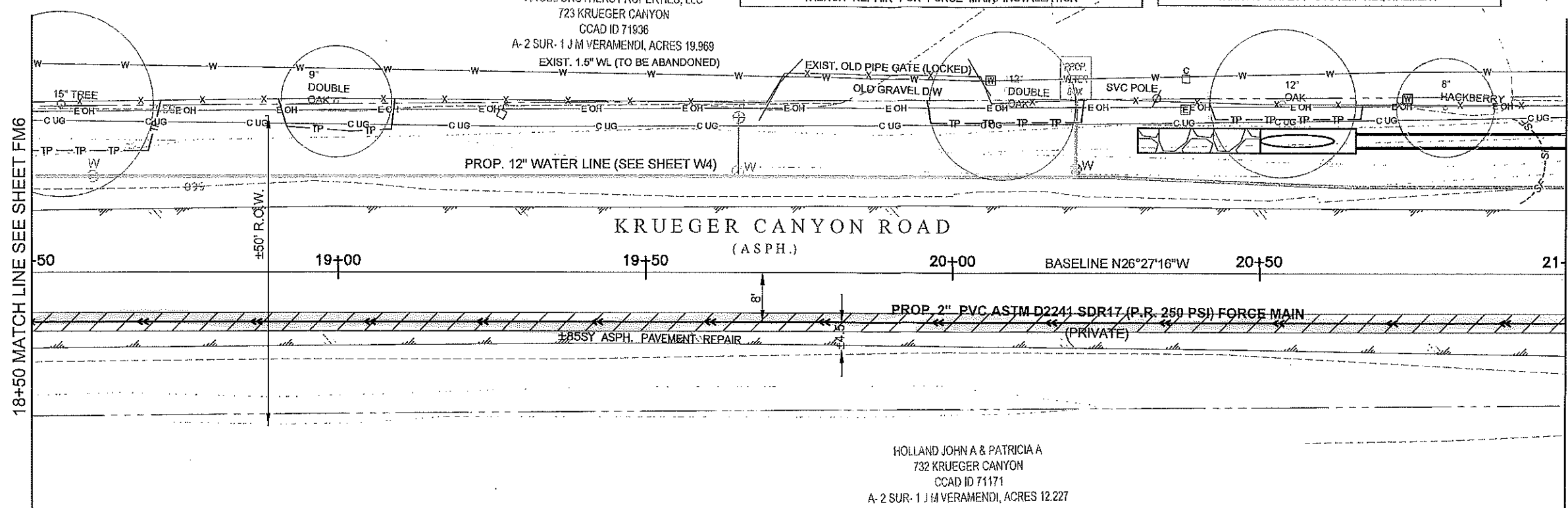
DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO.

FM6

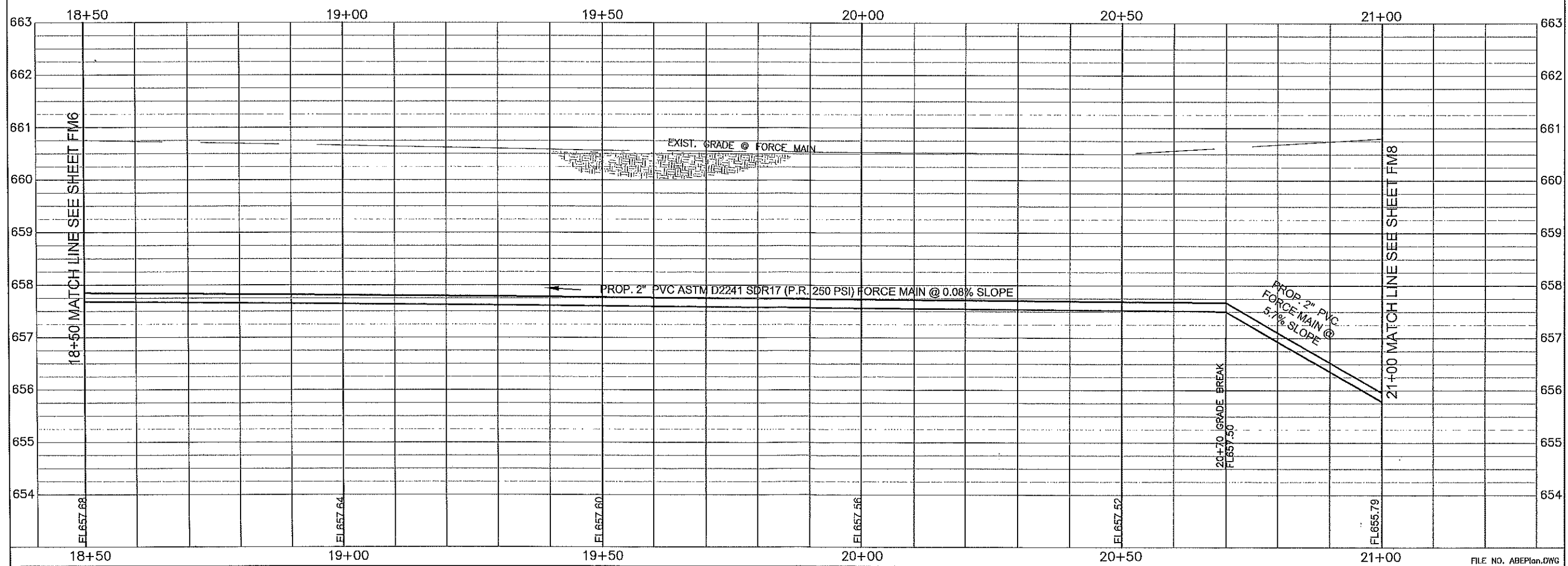
SHEET - OF -

CONTRACTOR SHALL MILL AND OVERLAY WITH 1.5" HMA TYPE D ON HALF OF PAVEMENT WIDTH (NORTHBOUND) UPON COMPLETION OF TRENCH REPAIR FOR FORCE MAIN INSTALLATION

CONTRACTOR SHALL REFER TO NEW BRAUNFELS UTILITIES GENERAL NOTES #23 ON SHEET 2 OF THE PLAN FOR TRENCH SAFETY SYSTEM REQUIREMENT



- LEGEND**
- FI EXIST. FIRE HYDRANT
 - WW EXIST. WASTEWATER MANHOLE
 - WM EXIST. WATER METER
 - WV EXIST. WATER VALVE
 - W EXIST. WATER LINE
 - S SIGN
 - M MAILBOX
 - EP ELECTRIC POLE
 - IRP IRON PIPE FOUND
 - IRF IRON ROD FOUND
 - MF MONUMENT FOUND
 - EC EXIST. CONTOUR
 - UG EXIST. UNDERGROUND COMMUNICATION CABLE
 - PC EXIST. COMMUNICATION PEDESTAL
 - FOUG EXIST. UNDERGROUND FIBER OPTIC
 - EOH EXIST. OVERHEAD ELECTRIC
 - CS CONTROL POINT SET
 - PL APPROXIMATE PROPERTY LINE
 - G EXISTING GAS LINE
 - WL PROP. WATER LINE
 - FM PROP. FORCE MAIN
 - WW PROP. WASTEWATER MANHOLE
 - SF PROP. SILT FENCE
 - TP PROP. TREE PROTECTION



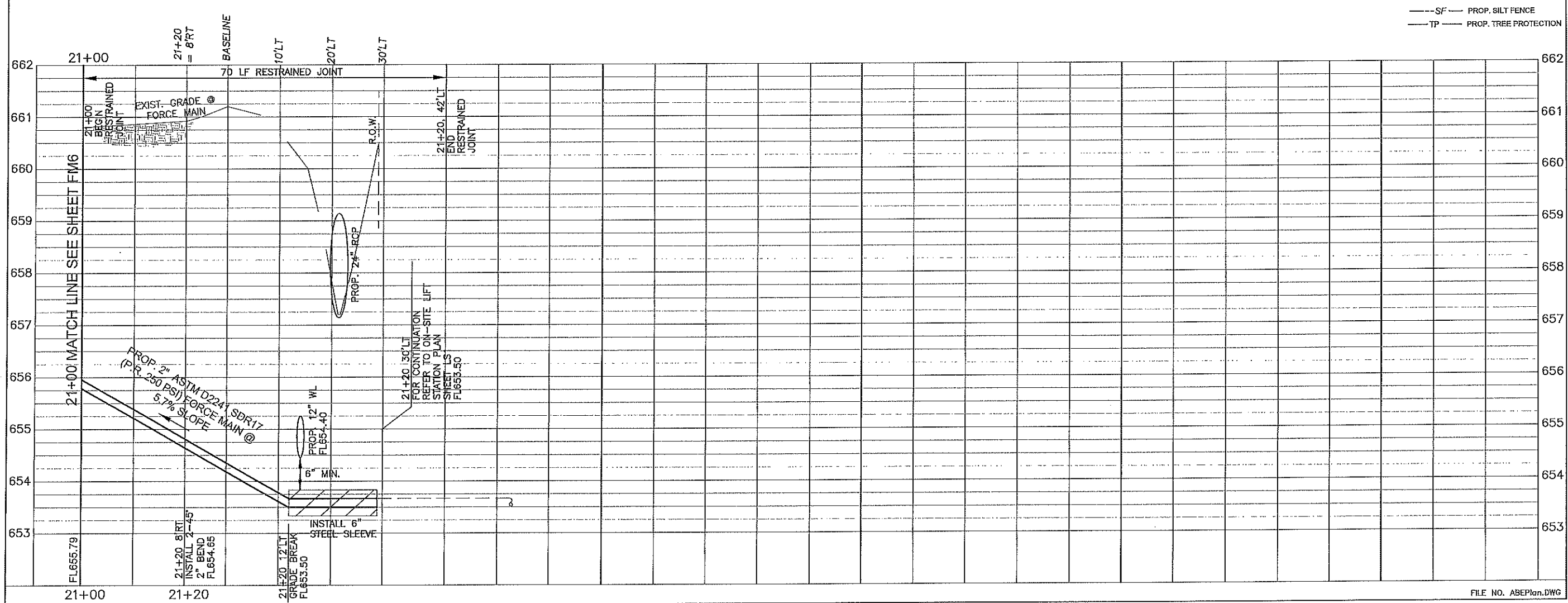
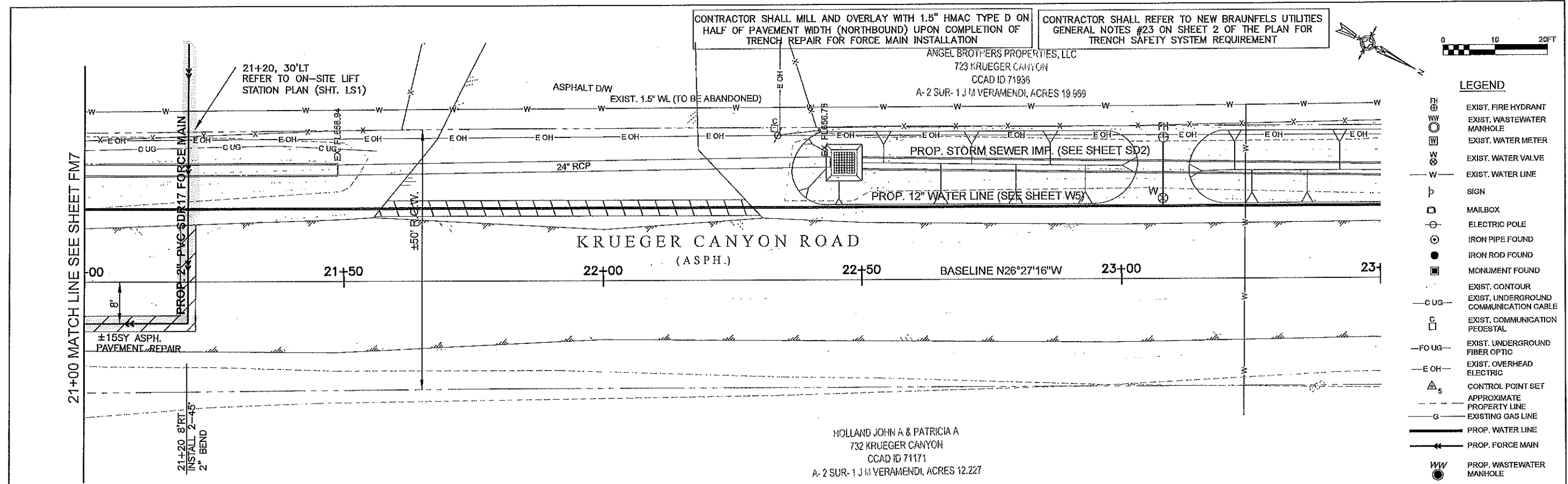
HEJL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUTTO, TX 78634
PH: (512) 642-3292
TOPE FIRM NO. F-755, TEPIS FIRM NO. 10058500

1/29/19

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
2" OFFSITE FORCE MAIN IMPROVEMENTS
STA. 18+50 TO STA. 21+00

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-29-19
SCALE: AS SHOWN
DWG. NO. **FM7**

SHEET - OF -



- LEGEND**
- EXIST. FIRE HYDRANT
 - EXIST. WASTEWATER MANHOLE
 - EXIST. WATER METER
 - EXIST. WATER VALVE
 - EXIST. WATER LINE
 - SIGN
 - MAILBOX
 - ELECTRIC POLE
 - IRON PIPE FOUND
 - IRON ROD FOUND
 - MONUMENT FOUND
 - EXIST. CONTOUR
 - EXIST. UNDERGROUND COMMUNICATION CABLE
 - EXIST. COMMUNICATION PEDESTAL
 - EXIST. UNDERGROUND FIBER OPTIC
 - EXIST. OVERHEAD ELECTRIC
 - CONTROL POINT SET
 - APPROXIMATE PROPERTY LINE
 - EXISTING GAS LINE
 - PROP. WATER LINE
 - PROP. FORCE MAIN
 - PROP. WASTEWATER MANHOLE
 - PROP. SILT FENCE
 - PROP. TREE PROTECTION

HEJL, LEE & ASSOCIATES, INC.
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206 TAYLOR STREET
HUTTO, TX 78634
Ph: (512) 642-3292

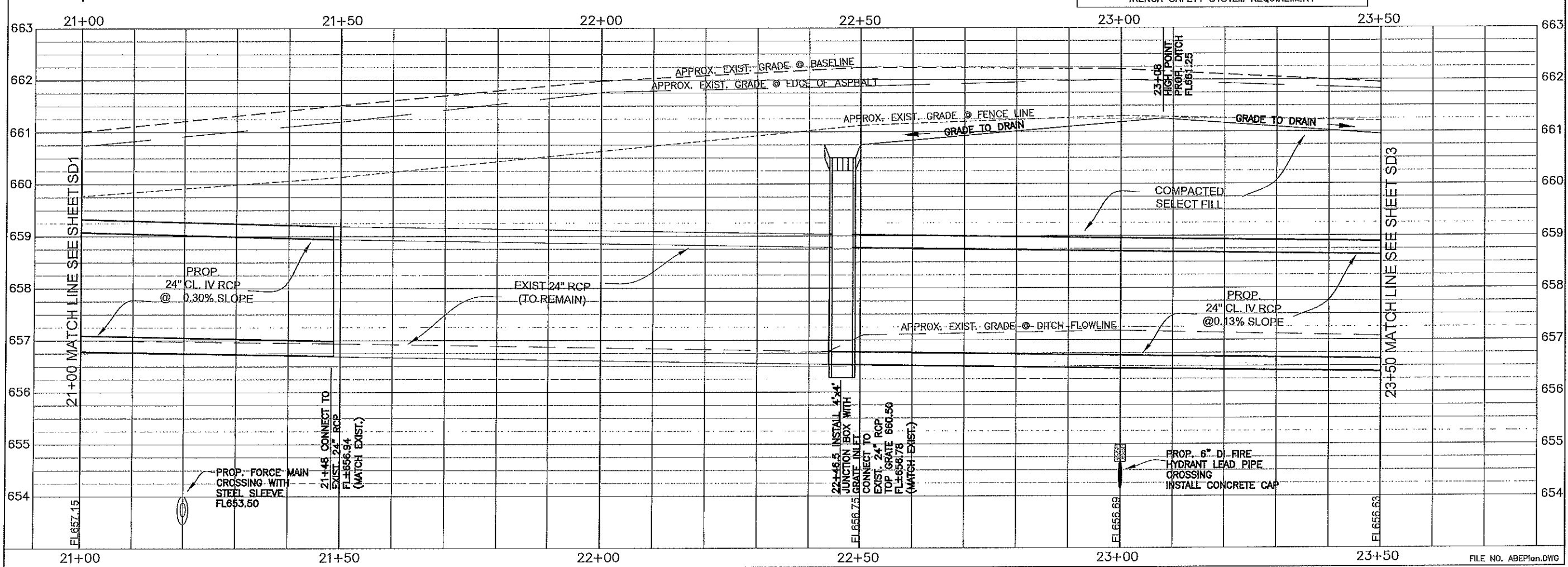
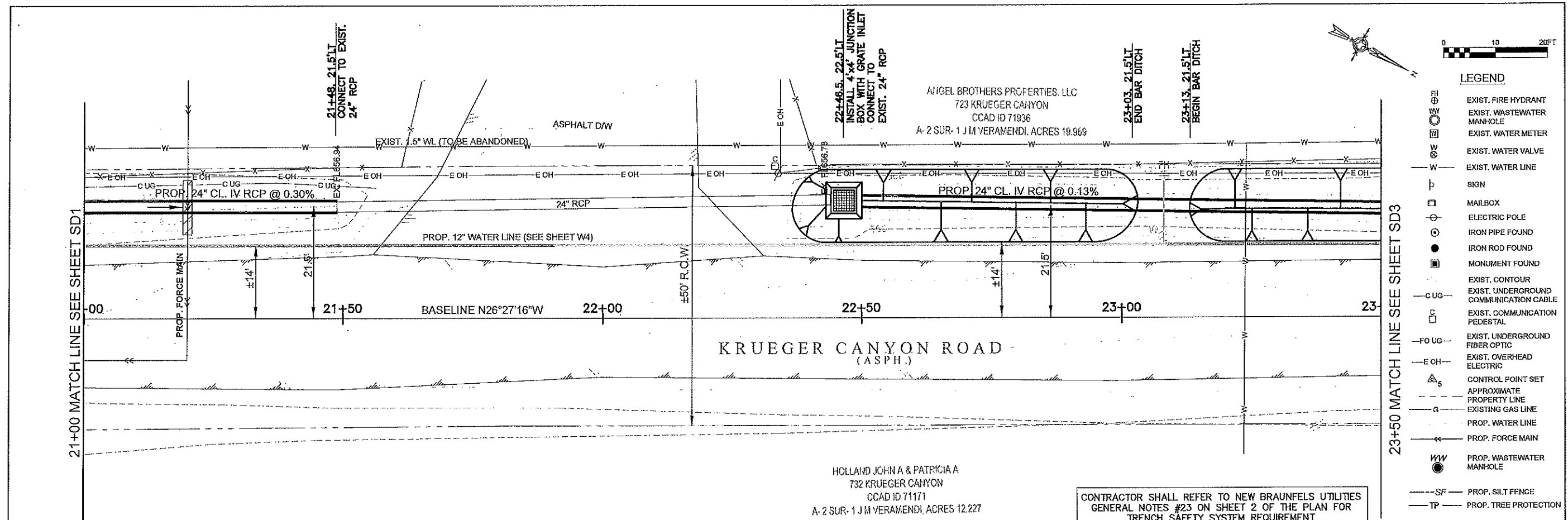
DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-31-19
SCALE: AS SHOWN
DWG. NO. **FM8**

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
2" OFFSITE FORCE MAIN IMPROVEMENTS
STA. 21+00 TO END

REVISIONS

NO.	DR	CK	DATE	DESCRIPTION

FILE NO. ABEPlan.DWG

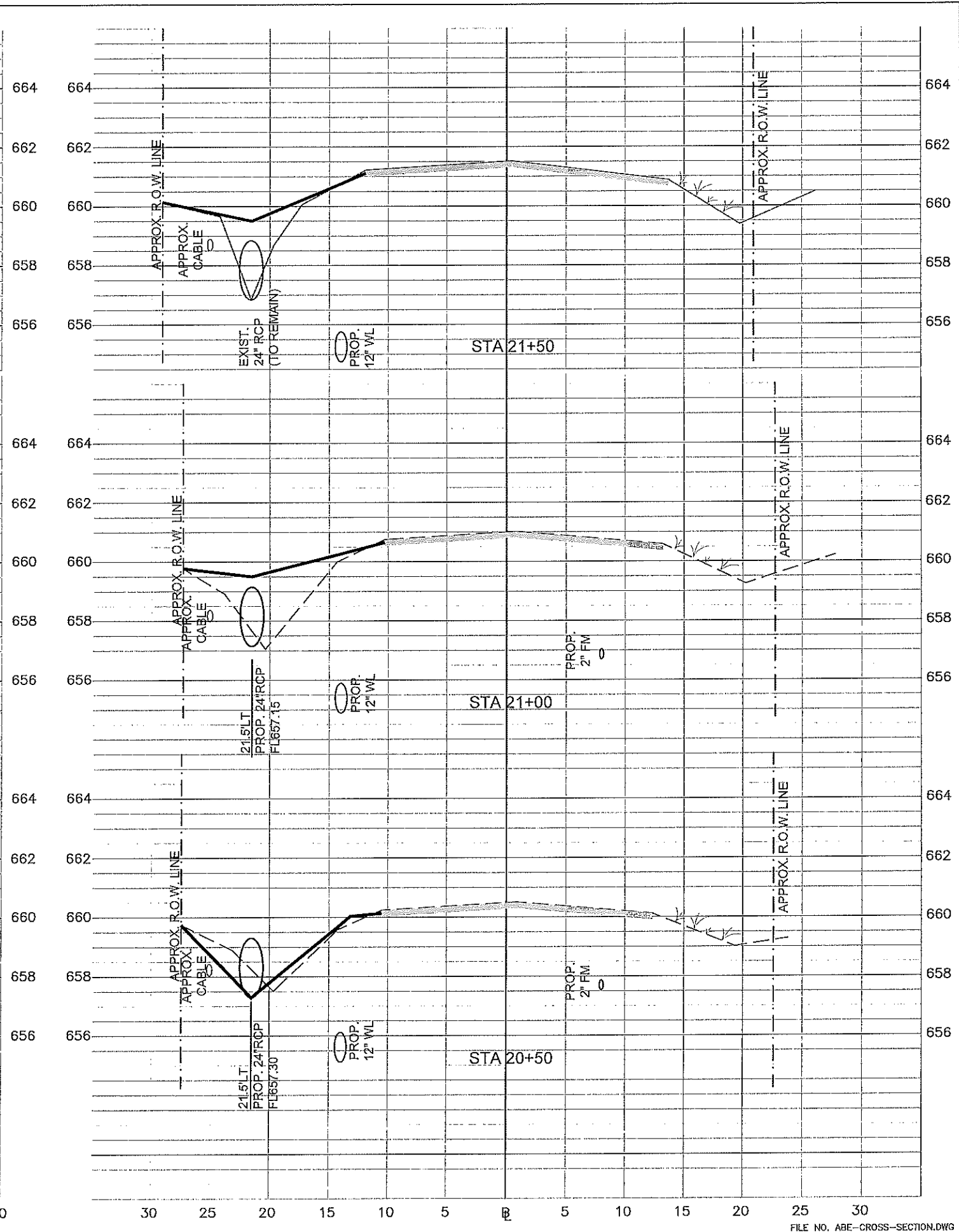
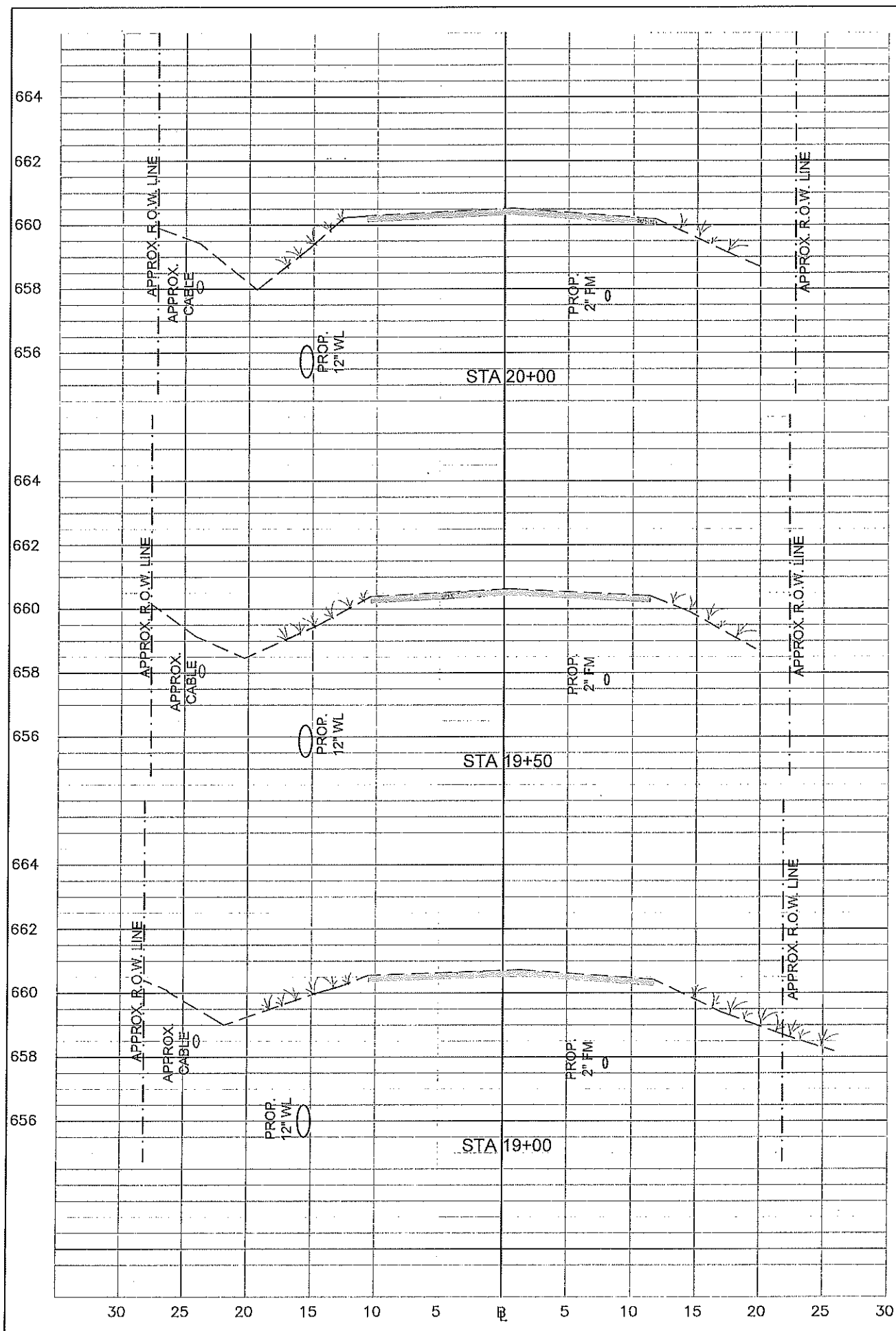


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HUTTO, TX 78634
PH: (512) 642-3292
TBP# FIRM NO. F-755, TBP# FIRM NO. 10058500

ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
OFFSITE DRAINAGE IMPROVEMENTS
STA. 21+00 TO STA. 23+50

DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-31-19
SCALE: AS SHOWN
DWG. NO. SD2

SHEET - OF -

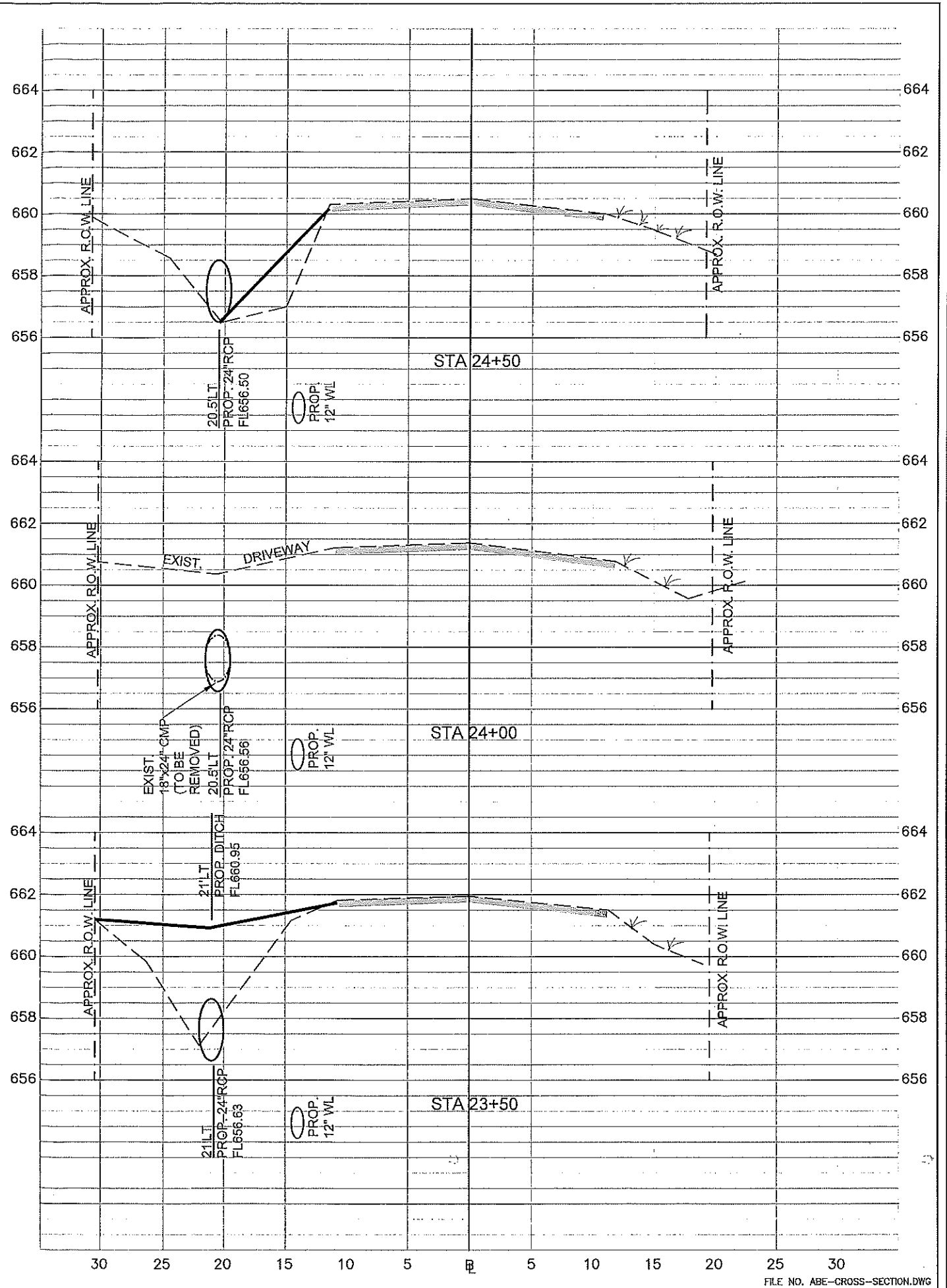
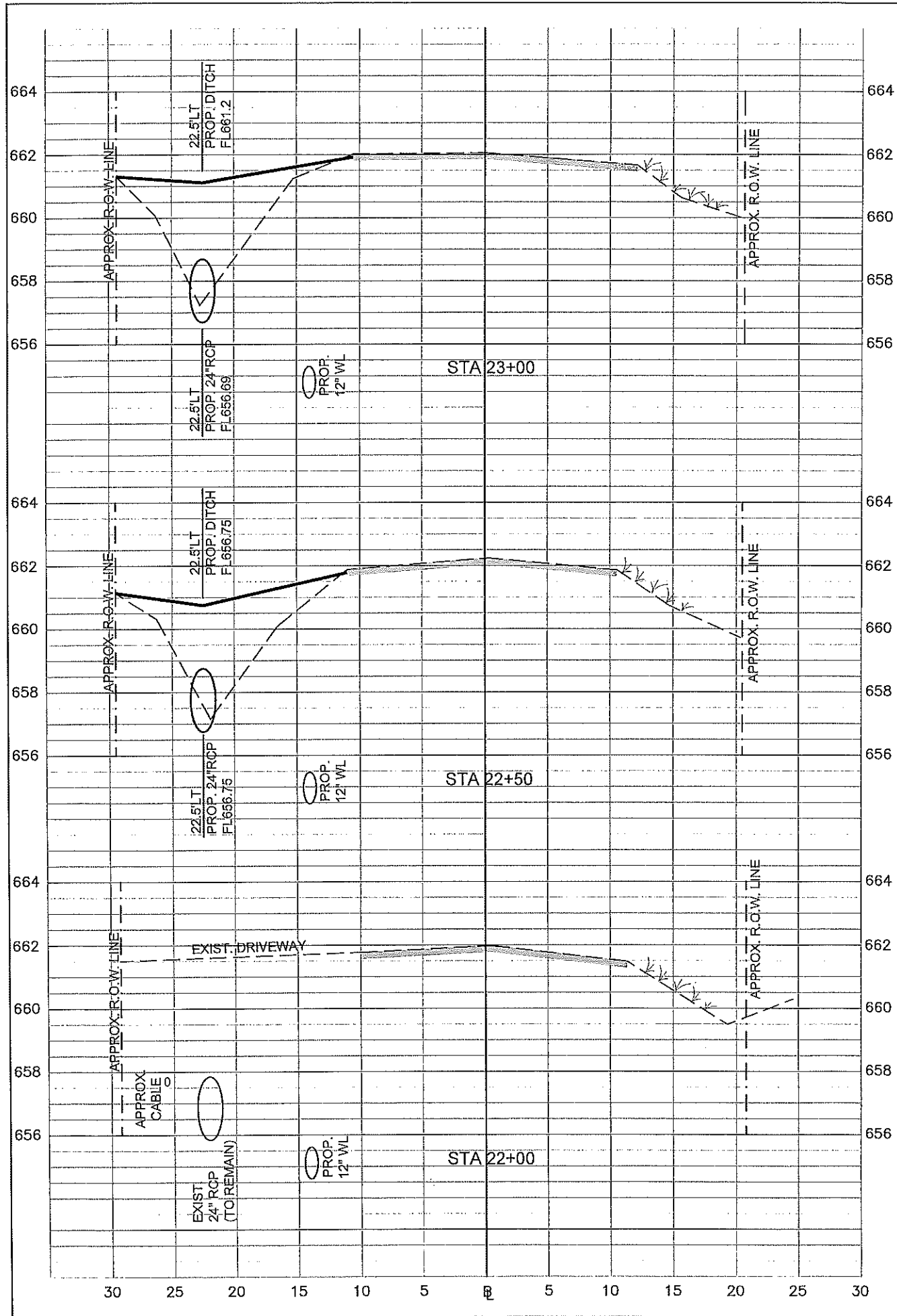


ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS

DESIGNED BY:	FND
DRAWN BY:	FND
REVIEWED BY:	CL
APPROVED BY:	DPH
PROJECT NO.:	P171105
DATE:	1-31-19
SCALE:	AS SHOWN
DWG. NO.	
XS1	
SHEET - OF -	

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HUTTO, TX 78634
Ph: (512) 642-3292
TBPB FIRM NO. F-755, TBPB FIRM NO. 10058500



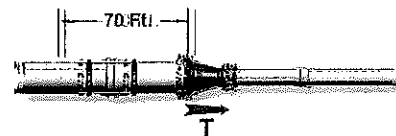
ANGEL BROTHERS ENTERPRISES NEW BRAUNFELS OFFICE WATER & WASTEWATER IMPROVEMENTS CROSS SECTION STA. 22+00 TO STA. 24+50		HEJL, LEE & ASSOCIATES, INC. ENGINEERING • SURVEYING • PLANNING 205 TAYLOR STREET HUNTO, TX 78634 PH: (512) 642-3292 TYPE FIRM NO. F-755, TPLS FIRM NO. 10058500	
DESIGNED BY:	FND	NO.	DR
DRAWN BY:	FND	CK	DATE
REVIEWED BY:	CL		
APPROVED BY:	DPH		
PROJECT NO.:	P171105		
DATE:	1-28-19		
SCALE:	AS SHOWN		
DWG. NO.	XS2		
SHEET - OF -		REVISIONS	

Project Notes:



Site Name: Water Line STA. 11+10

Side Notes:



ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE.
 IF YOU DISAGREE WITH THESE TERMS, PLEASE CONTACT THE NATIONAL ARCHIVES AT 866.834.4739.

Defined/Variables	Defined/Variables	Definition/Description	Value
$H_0 =$	$r_{\text{eff}} =$	0.00°C Celsius Difference between	$W_{\text{eff}} = 7.7 \times 10^{-4} \text{ m}$
$H_1 =$	$c =$	0°C Celsius Difference	302.500°C Normal Force Due to Soil
$H_2 =$	$r_{\text{eff}} =$	0.70°C Friction Angle Difference	667.700°C Normal Force Acting on Pipeline
$H_3 =$	$\phi_{\text{eff}} =$	36.31° Friction Angle Difference	$(W_{\text{eff}})_{\text{eff}} = 1.1 \times 10^{-4} \text{ m}$
$H_4 =$	$\gamma_{\text{eff}} =$	110.58 kN/m³ Density	3.456 m Area Based on Full Pipe Circumference
$H_5 =$	$(F_{\text{eff}})_{\text{eff}} =$	$(F_{\text{eff}})_{\text{eff}} = 1.1 \times 10^{-4} \text{ m}$	314.156 m Frictional Resistance
$H_6 =$	$U_{\text{eff}} =$	$U_{\text{eff}} = 1.1 \times 10^{-4} \text{ m}$	69.243 m Minimum Restraint Length for Reduced Sliding

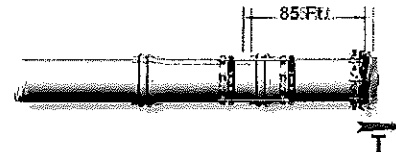
Created by FHIA under E.O. 12812 and E.O. 12958, 7/12/2009

Project Notes:



Station Name: Water Line Sta. 18+60

Sale Notes: Assume all equipment is sold at 22% above book value.



ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

Derived Variables	Derived Variables	Relationships to Design Data
$H_{FE} = 4 \times \text{Design Force}$	$F_{FE} = 0.60 \times \text{Ultimate Tensile Strength}$	$W_F = F_{FE} \times D \times H = 484,000 \text{ lb}$ Normal Force Due to Seal
$S_{FE} = 1.5 \times \text{Design Force}$	$C_{FE} = 0.4 \times \text{Ultimate Strength}$	$W_{FE} = W_F \times C_{FE} = 193,600 \text{ lb}$ Normal Force Acting on Expansion
$P_{FE} = 2.0 \times \text{Normal Resistance}$	$F_{FE} = 0.70 \times \text{Ultimate Strength}$	$(W_F)_{FE} = D \times W_F = 3,456 \text{ lb}$ Area Based on Full Pipe Circumference
	$D_{FE} = 3.6 \times \text{Ultimate Strength}$	$F_{FE} = (A_{FE})_{FE} \times F_{FE} = W_{FE} \times (F_{FE})_{FE} \times D_{FE} = 485,016 \text{ lb}$ Friction Resistance
	$\gamma_{FE} = 110 \times \text{Design Force}$	$U = S_{FE} \times H \times A_{FE} = 846,480 \text{ lb}$ Minimum Restricted Length of Dead End
Input Derived Variables		
$A_{FE} = 136.85 \times \text{Yield Stress Area of Pipe}$		
$C_{FE} = 1.10 \times \text{Design Force Coefficient}$		
$W_F = 122.7 \times \text{Design Force}$		
$W_{FE} = 58.53 \times \text{Design Force}$		

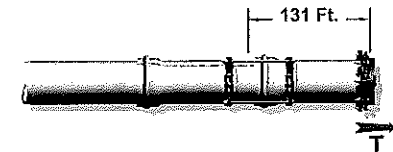
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Project Notes:



Site Name: Waterline Sta. 111+10

Site Notes: Assume Dead End (In-Line 122 Gate Valve Close)



ALL JOINTS WITHIN THE CALCULATED LENGTH MUST BE RESTRAINED.
IF YOUR DISTANCE BETWEEN FITTINGS IS LESS THAN OR EQUAL TO THE CALCULATED RESTRAINT LENGTH, RESTRAIN ALL JOINTS BETWEEN THOSE FITTINGS.

Defined Variables	Defined Variables	Calculations for Dead End
Hft = 2.5 Depth of Bury	$f_c = 0.00$ Cohesion Modifier Coefficient	$W_L = \gamma \cdot D \cdot H = 302.500$ Normal Force Due to Soil
$S_f = 1.5$ Safety Factor	$c = 0.00$ Cohesion of Soil	$W = 2W_L + W_r + W_u = 667.700$ Normal Force Acting on Pipeline
Pp = 200 Internal Pressure	$f_a = 0.70$ Friction Angle Modifier	$(A_p)_c = \pi \cdot D = 3.456$ Area Based on Full Pipe Circumference
	$\phi = 36$ Internal Friction Angle of Soil	$F_a = (A_p)_c \cdot f_c + c + W \cdot \tan(\pi / 180) f_a \cdot \phi = 314.196$ Frictional Resistance
	$\gamma = 110$ Soil Density	$L = S_f \cdot P \cdot A / F_a = 130.667$ Minimum Restrained Length of Dead End
Pipe Derived Variables		
$A_c = 136.85$ Cross Sec. Area of Pipe		
$D_o = 1.10$ Outside Pipe Diameter		
$W_p = 12.17$ Weight of Pipe		
$W_w = 50.53$ Weight of Water in Pipe		

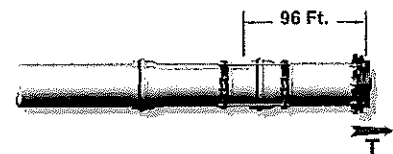
Created by FHIA John's Restrict Length Calculator v7.1.2 on January 29, 2018

Project Notes:



Slide Name: Water Line Sta. 26+27

Side Notes:



ALL JOINTS WITHIN THE CALCULATED LENGTH MUST BE RESTRAINED.
IF YOUR DISTANCE BETWEEN FITTINGS IS LESS THAN OR EQUAL TO THE CALCULATED RESTRAINT LENGTH, RESTRAIN ALL JOINTS BETWEEN THOSE FITTINGS.

Defined Variables		Calculations for Dead End	
H _{it} =	3.5 Depth of Bury	$W_B = \gamma \cdot D \cdot H =$	423.500 Normal Force Due to Soil
S _{ty} =	0.5 Safety Factor	$W = 2W_B + W_p + W_w =$	909.700 Normal Force Acting on Pipeline
P _{int} =	200 Internal Pressure	$(A_p)_s = \pi \cdot D =$	3.456 Area Based on Full Pipe Circumference
Pipe Derived Variables		$F_R = (A_p)_s \cdot f_c \cdot c + W \cdot \sin(\pi / 180) (f_s \cdot \Phi) =$	428.072 Frictional Resistance
A _{ps} =	136.65 Cross Section Area of Pipe	$L = S_y \cdot P \cdot A / F_R =$	95.907 Minimum Restraint Length of Dead End
D _{ps} =	1.10 Outside Pipe Diameter		
W _{ps} =	12.17 Weight of Pipe		
W _{wps} =	50.53 Weight of Water in Pipe		

Created by EDAAD from its Restricted Longitudinal Collection v7.1.2 on January 29, 2019

FILE NO. P171105_D.DWG

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TBPE FIRM NO. F-755, TBPLS FIRM NO. 10058500



ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE

RESTRAINT JOINT CALCULATION

DESIGNED BY:	FND
DRAWN BY:	FND
REVIEWED BY:	CL
APPROVED BY:	DPH
PROJECT NO.:	P171105
DATE:	1-30-19
SCALE:	AS SHOWN
DWG. NO.	

R1

SHEET - OF -

Project Name: ANGEL BROTHERS OFFSITE WATER AND WASTEWATER
Project Notes:

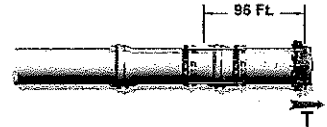


RESTRAINT LENGTH VALUES

Filling Type	Pipe Material	Soil Type	Safety Factor	Trench Type	Depth of Bury	Test Pressure	Nominal Size	Bend Angle	Branch Size	Length Along Run	Reduced Size	Lowside Depth	Restraint Length	Restraint Length 2
Open End	HDPE	GSW	1.15	44	33.5 FT	2200 PSI	12 in.						30 FT	

SB Station: Waterline Sta. 26+50

SB Station: 26+50 (approximate) (Data Entry #123456789)

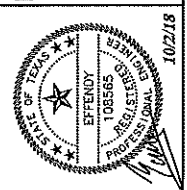


ALL WORKS SHOWN ARE CALCULATED BY HMA INC. AND ARE NOT TO BE USED FOR ANY OTHER PURPOSES WITHOUT THE WRITTEN PERMISSION OF HMA INC.

Defined Variables	Input Variables	Calculation for Defined End
1. H = 3.5 (Depth of Bury)	1. H = 3.5 (Depth of Bury)	$W_p = \gamma H^2 R$ = 421.500 (Nominal Force Due to Soil)
2. S = 1.5 (Safety Factor)	2. S = 1.5 (Safety Factor)	$W_p = S W_p$ = 632.250 (Nominal Force Due to Soil)
3. P = 1.0 (Internal Pressure)	3. P = 1.0 (Internal Pressure)	$W_p = P W_p$ = 632.250 (Nominal Force Due to Soil)
4. A = 1.0 (Area of Pipe)	4. A = 1.0 (Area of Pipe)	$W_p = A W_p$ = 632.250 (Nominal Force Due to Soil)
5. D = 1.0 (Diameter of Pipe)	5. D = 1.0 (Diameter of Pipe)	$W_p = D W_p$ = 632.250 (Nominal Force Due to Soil)
6. W = 1.0 (Weight of Pipe)	6. W = 1.0 (Weight of Pipe)	$W_p = W W_p$ = 632.250 (Nominal Force Due to Soil)

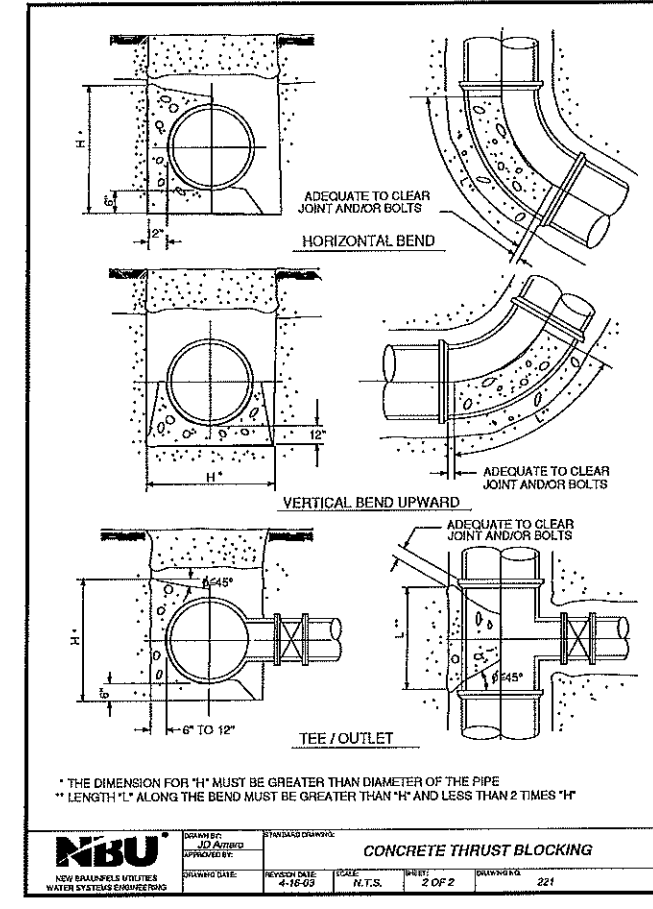
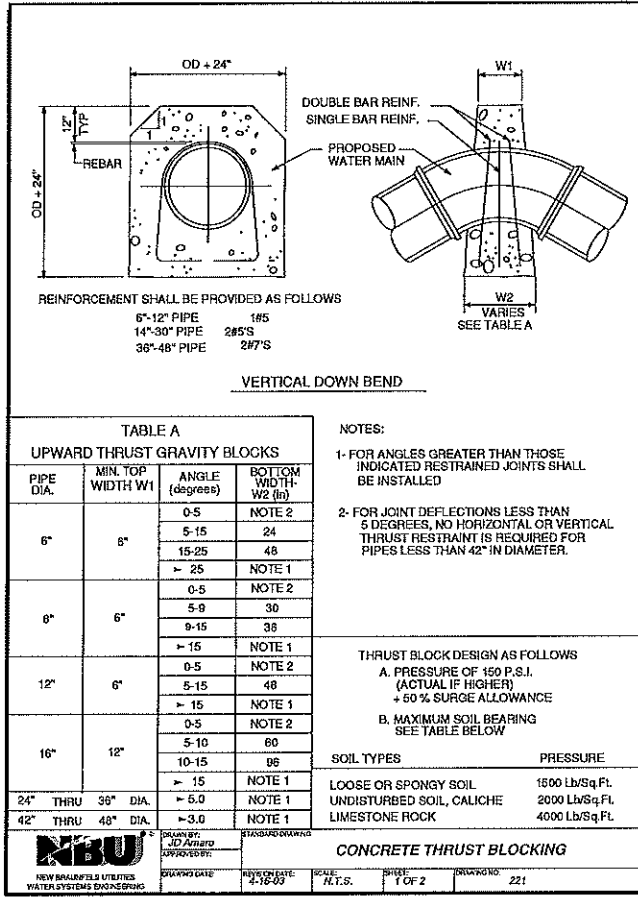
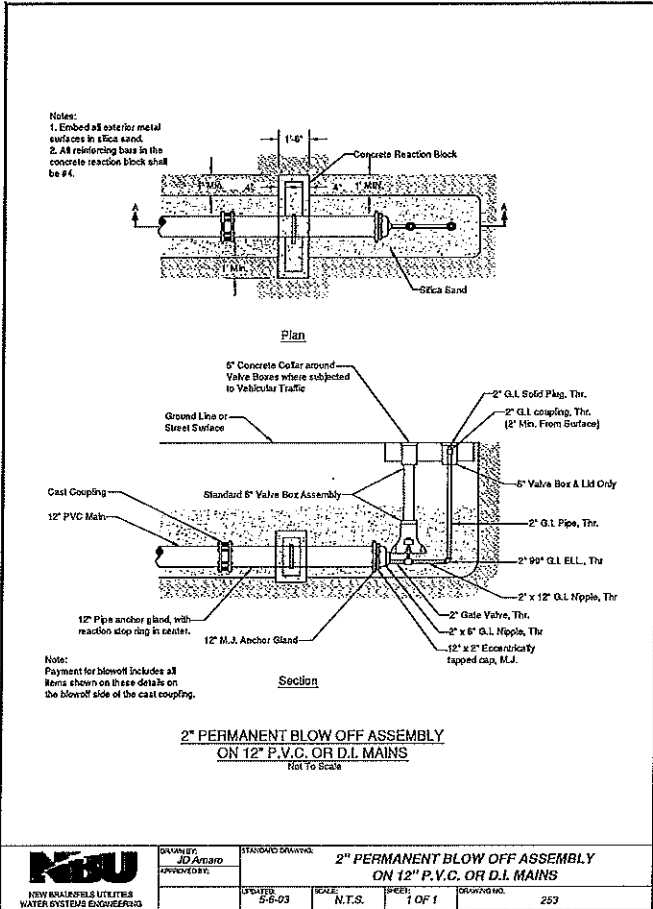
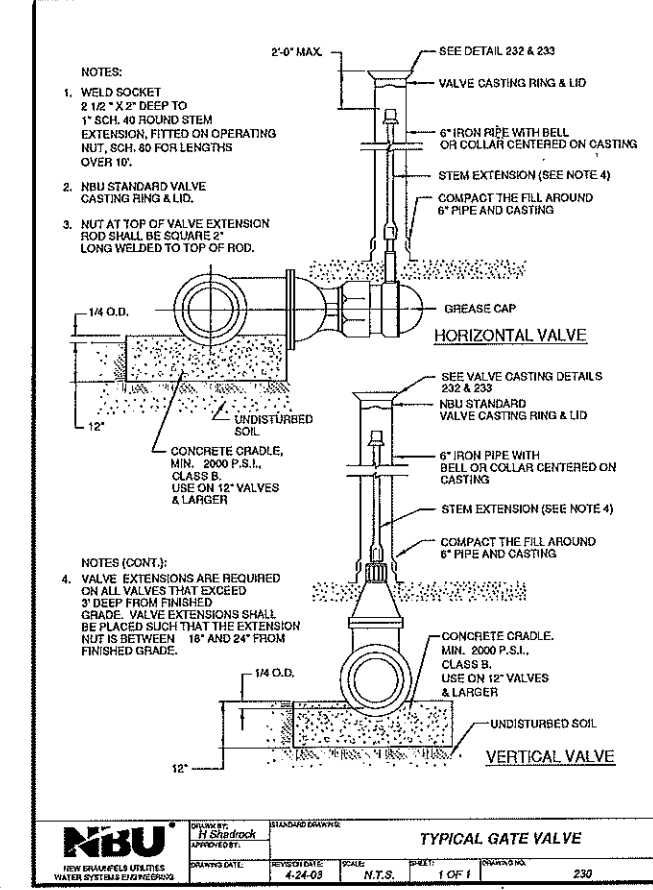
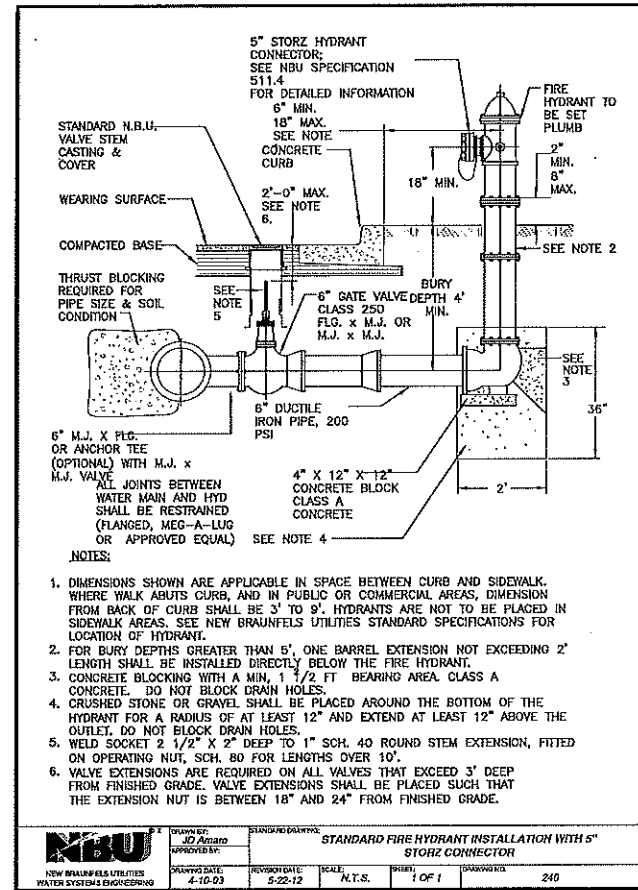
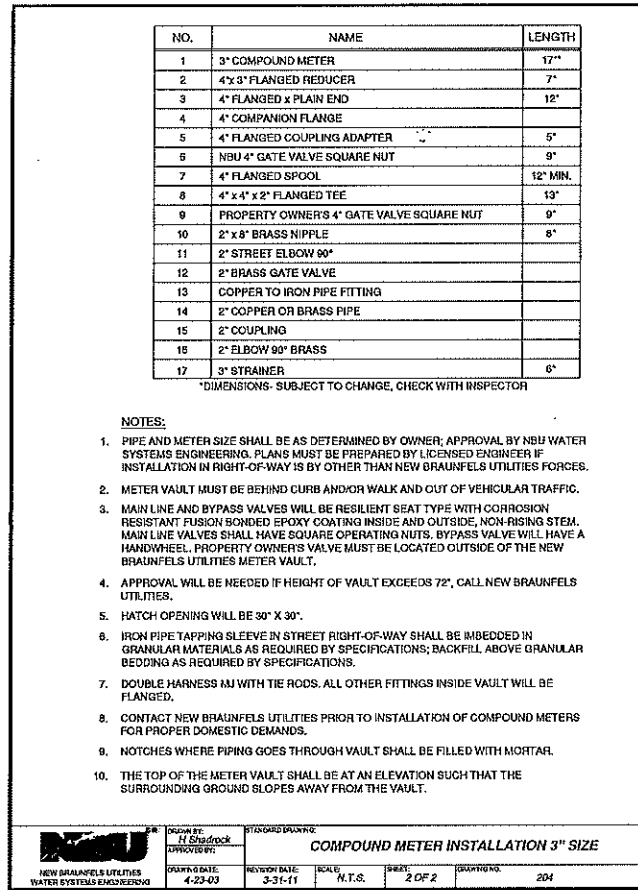
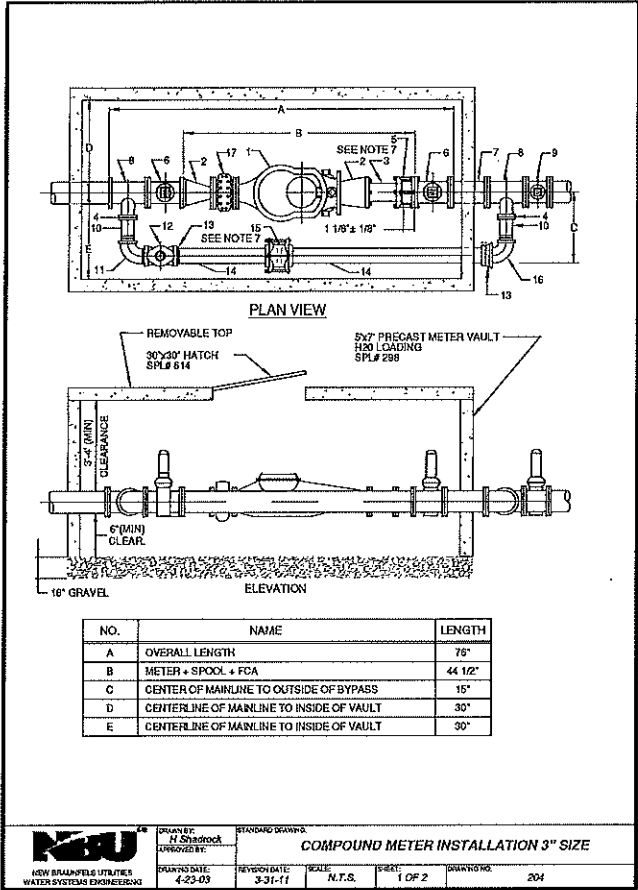
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TBE FIRM NO. F-755, TBE FIRM NO. 10058500



ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS
RESTRAINT JOINT CALCULATION

DESIGNED BY:	FND
DRAWN BY:	FND
REVIEWED BY:	CL
APPROVED BY:	DPH
PROJECT NO.:	P171105
DATE:	2-28-18
SCALE:	AS SHOWN
OWG. NO.	R2
SHEET	OF



HEJL, LEE & ASSOCIATES, INC.

ENGINEERING • SURVEYING • PLANNING

206 TAYLOR STREET

HUTTO, TX 78634

PH: (512) 642-3292 FAX: (512) 642-4230

TELE FIRM NO. F-755, TBLS FIRM NO. 10058500

DESIGNED BY: FND

DRAWN BY: FND

REVIEWED BY: CL

APPROVED BY: DPH

PROJECT NO.: P171105

DATE: 1-30-19

SCALE: AS SHOWN

DWG. NO. D1

SHEET - OF -

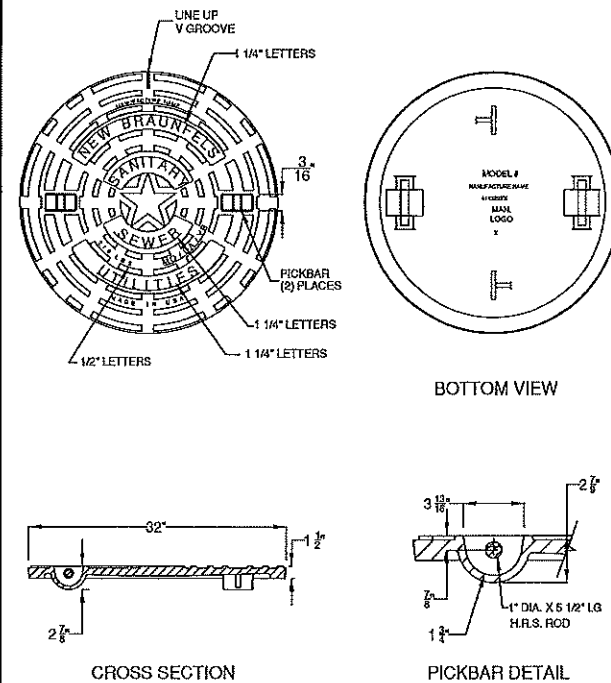
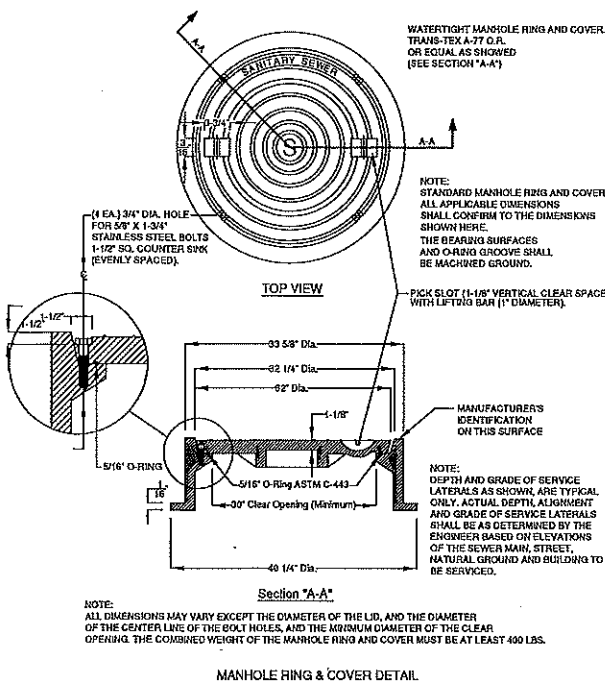
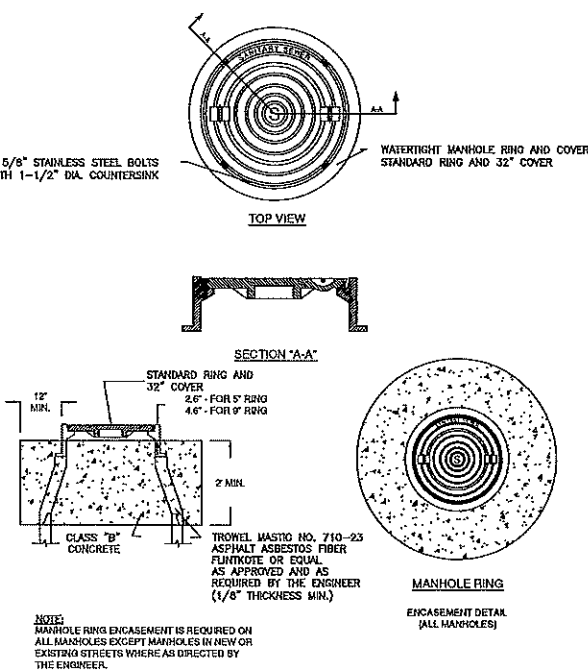
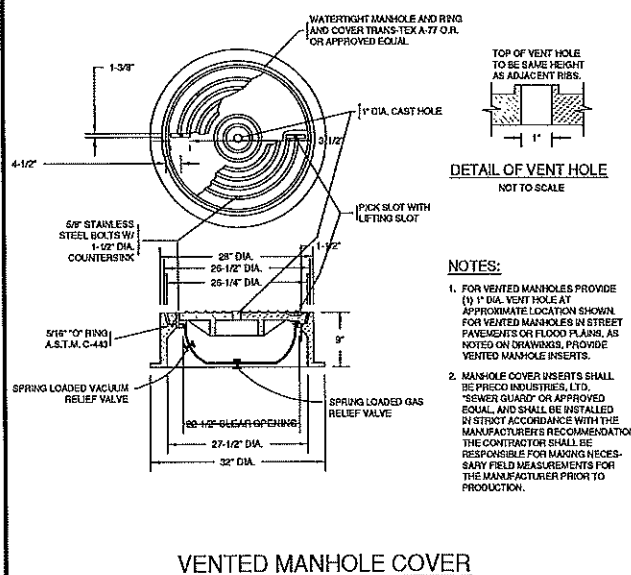
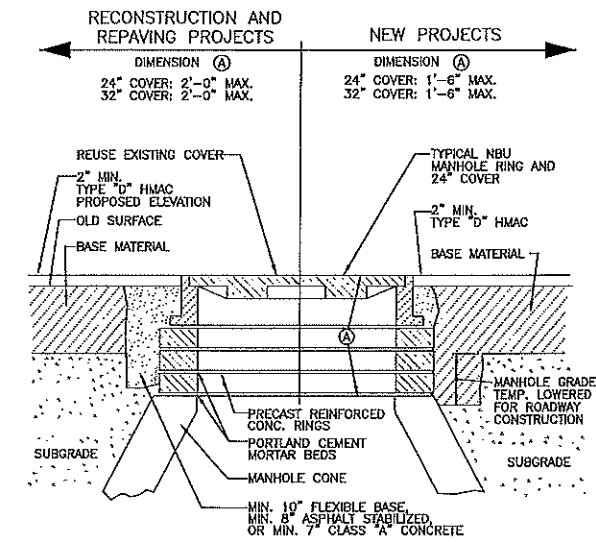
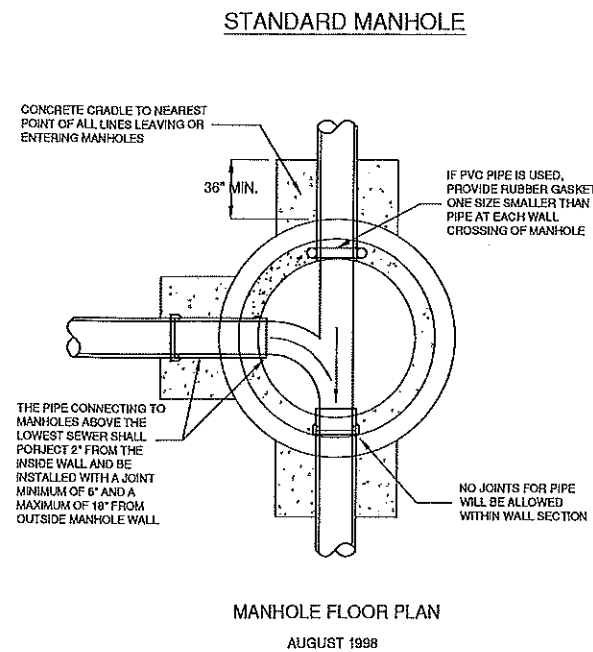
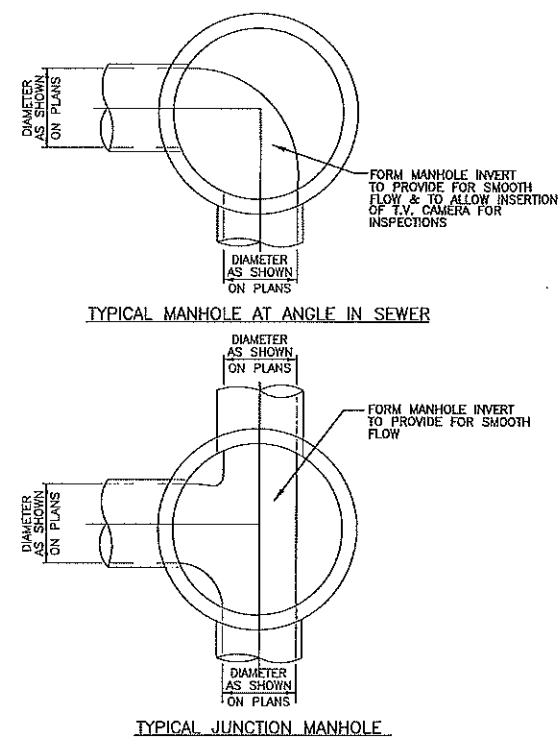
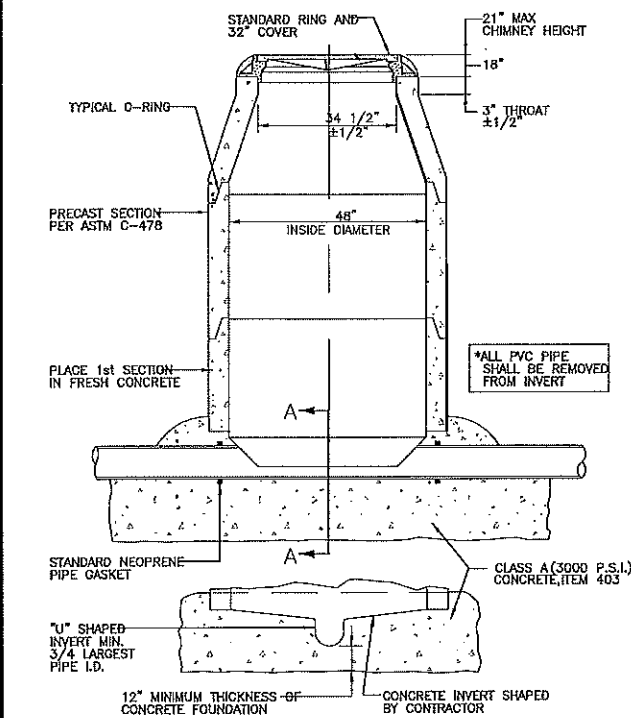
ANGEL BROTHERS ENTERPRISES

NEW BRAUNFELS OFFICE

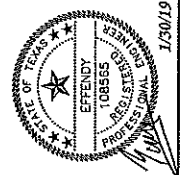
WATER & WASTEWATER IMPROVEMENTS

DETAILS

130179

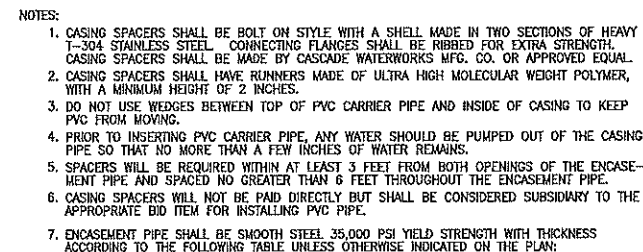
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TBPE FIRM NO. F-755, TBPLS FIRM NO. 10058500



ANGEL BROTHERS ENTERPRISES NEW BRAUNFELS OFFICE WATER & WASTEWATER IMPROVEMENTS	DETAILS
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DESIGNED BY:	FND
DRAWN BY:	FND
REVIEWED BY:	CL
APPROVED BY:	DPH
PROJECT NO.:	P171105
DATE:	1-30-19
SCALE:	AS SHOWN
DWG. NO.	D2
SHEET	- OF -



PIPE SIZE—CARRIER (DIAMETER) 6"	PIPE SIZE—CASING (DIAMETER)(MIN.) 16"	MINIMUM PIPE THICKNESS (INCHES)
8"	18"	1/4 0.2500
10"	20"	5/16 0.3125
12" — 14"	24"	3/8 0.3750
16" — 18"	30"	7/16 0.4375
20"	36"	1/2 0.5000
24"	42"	1/2 0.5000
30"	48"	1/2 0.5000

CATCHBASIN TRAFFIC DUTY, GRATE, PARK EQUIPMENT CO. 688-611-PARK MODEL CB

KNOCKOUT BOX, 304-RESISTANT-STEEL, PEDESTALAN DUTY STD. [TRAFFIC DUTY OPTIONAL], PARK EQUIPMENT CO. 688-611-PARK MODEL JB

PRECAST CONCRETE TOP W/ CAST-IN FRAME

PRECAST CONCRETE BASIN SECTION

THIN WALL KNOCKOUT ON ALL 4 SIDES, SEE KO DIMENSION FOR MAXIMUM PIPE O.D.

INLET FROM FLOW LINE

OUTLET FROM TO FLOW LINE

INLET FROM FLOW LINE

OUTLET FROM TO FLOW LINE

NOTE:
RISER SECTION AVAILABLE IN 6" TO 18" DEPTHS.

MODEL #	DIMENSIONS									
CATCH BASIN BOX	W1	W2	H1	H2	T1	KO	GRATE/COVER SIZE	HEIGHT	WGT.	NET WT.
CB48 JB48	60"	60"	54"	48"	6"	48"	36"x36"x2"	8,000	165	158
CB60 JB60	72"	60"	66"	60"	6"	60"	36"x36"x2"	10,000	200	180
CB72 JB72	84"	72"	78"	72"	6"	72"	36"x36"x2"	12,000	235	215
CB84 JB84	96"	84"	90"	84"	6"	84"	36"x36"x2"	14,000	270	250

1. ALL JUNCTION BOXES ARE STANDARD PEDESTALAN DUTY OR OPTIONAL TRAFFIC DUTY.

NOTE:
CONTRACTOR SHALL VERIFY THE DIMENSION AND FLOW LINE OF THE PROPOSED CULVERTS PRIOR TO ORDER THE JUNCTION BOX

SPECIFICATIONS

CONCRETE : Class 1 concrete with of design strength of 4500 PSI at 28 days. Unit is of monolithic construction at floor and first stage of wall with sectional riser to required depth. Rated for H-20 Loading.

REINFORCEMENT: Grade 60 reinforced. Steel rebar conforming to ASTM A615 in required centers or equal.

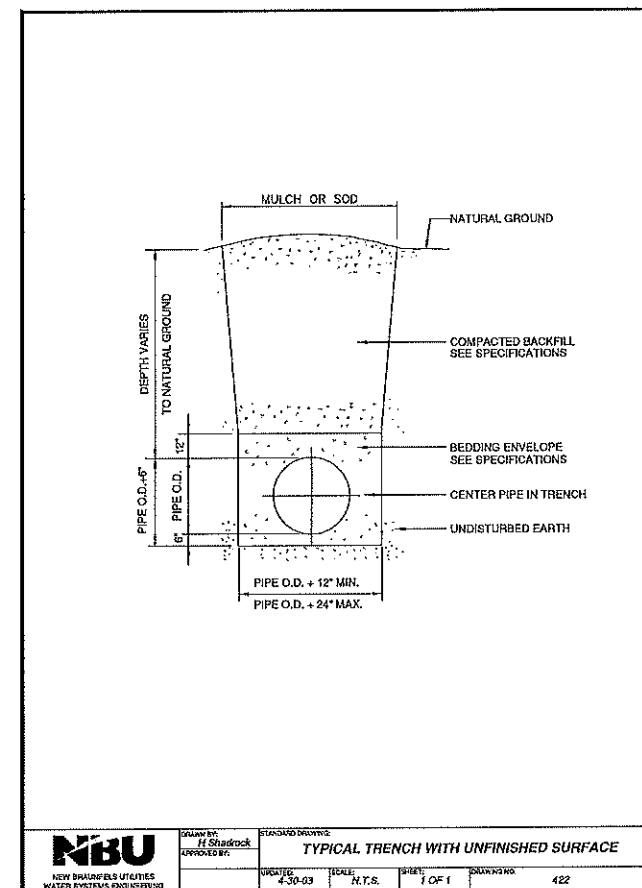
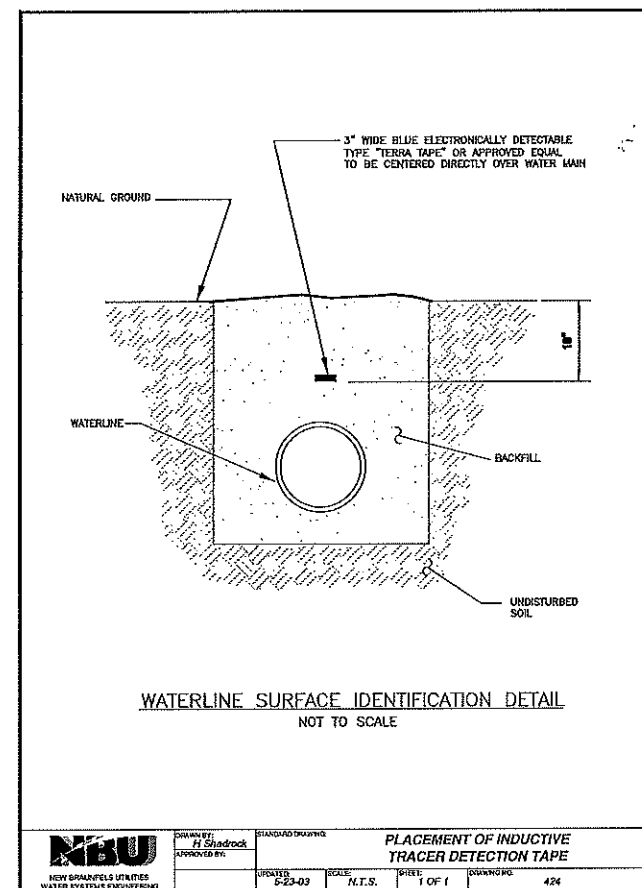
C.I. CASTINGS: Cast iron frames and grates are manufactured of grey cast iron conforming to ASTM A48-76 Class 30.

Q&A 11,7278
Q&A 11,7278
Q&A 11,7278

CATCHBASIN MODEL CB - 48" THRU 84" JUNCTION BOX MODEL JB - 48" THRU 84"

DATE NONE **DRG. NO.** CB8484

DATE 01/02 **REV.**

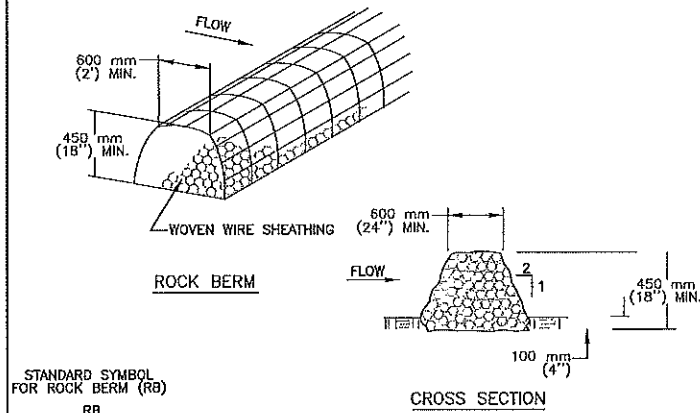


DESIGNED BY:	FND
DRAWN BY:	FND
REVIEWED BY:	CL
APPROVED BY:	DPH
PROJECT NO.:	P171105
DATE:	1-30-19
SCALE:	AS SHOWN
DWG. NO.	D3
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TBEF FIRM NO. F-755, TBPLS FIRM NO. 10058500

DETAILS

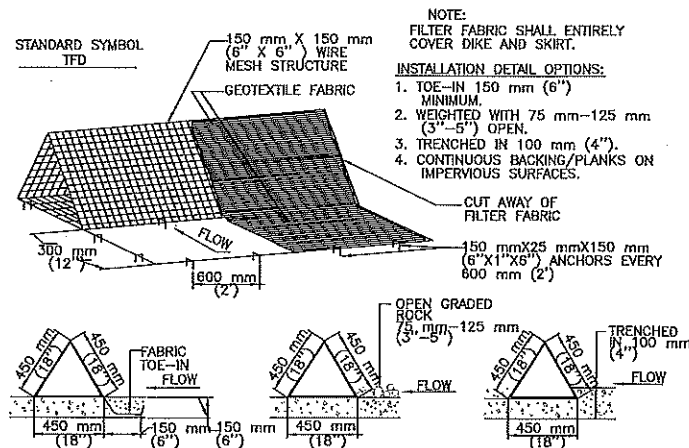
REVISIONS	DESCRIPTION
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NOTES:

1. USE ONLY OPEN GRADED ROCK 100 to 200 mm (4 to 8") DIAMETER FOR STREAM FLOW CONDITIONS. USE OPEN GRADED ROCK 75 to 125 mm (3 to 5") DIAMETER FOR OTHER CONDITIONS.
2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 25 mm (1") OPENING AND MINIMUM WIRE DIAMETER OF 12.9 mm (20 GAUGE). ROCK BERMS IN CHANNEL APPLICATIONS SHALL BE ANCHORED FIRMLY INTO THE SUBSTRATE A MINIMUM OF 150 mm (6") WITH T-POSTS OR WITH 15M OR 20M (#5 OR #6) REBAR, WITH MAXIMUM SPACING APART OF 1.2 m (48") ON CENTER.
3. THE ROCK BERM SHALL BE INSPECTED WEEKLY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE-WOVEN SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. WHEN SILT REACHES A DEPTH EQUAL TO ONE-THIRD THE HEIGHT OF THE BERM OR 150 mm (6"), WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SILTATION PROBLEM.
5. DAILY INSPECTION SHALL BE MADE ON SEVERE-SERVICE ROCK BERMS; SILT SHALL BE REMOVED WHEN ACCUMULATION REACHES 150 mm (6").
6. WHEN THE SITE IS COMPLETELY STABILIZED, THE BERM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

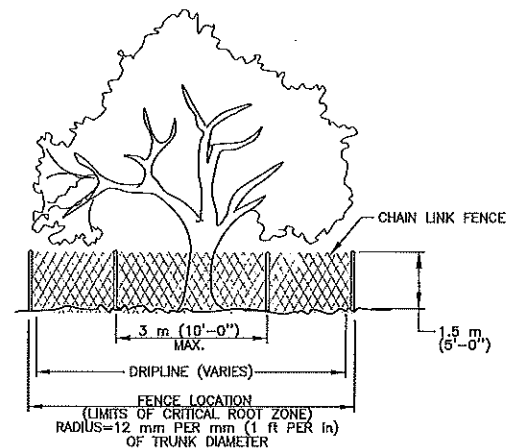
ROCK BERM
N.T.S.



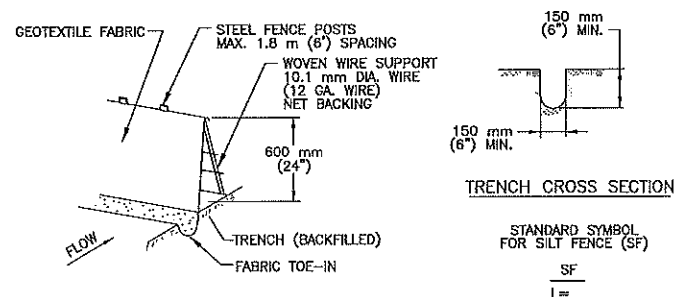
GENERAL NOTES

1. DIKES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT DIKE.
2. THE FABRIC COVER AND SKIRT SHALL BE A CONTINUOUS WRAPPING OF GEOTEXTILE. THE SKIRT SHALL BE A CONTINUOUS EXTENSION OF THE FABRIC ON THE UPSTREAM FACE.
3. THE SKIRT SHALL BE WEIGHTED WITH A CONTINUOUS LAYER OF 75-125 mm (3-5") OPEN GRADED ROCK OR TOE-IN 150 mm (6") WITH MECHANICALLY COMPACTED MATERIAL. OTHERWISE, THE ENTIRE STRUCTURE SHALL BE TRENCHED IN 100 mm (4").
4. DIKES AND SKIRT SHALL BE SECURELY ANCHORED IN PLACE USING 150 mm (6") WIRE STAPLES ON 600 mm (2') CENTERS ON BOTH EDGES AND SKIRT, OR STAKE USING 10M (3/8") DIAMETER RE-BAR WITH TEE ENDS.
5. FILTER MATERIAL SHALL BE LAPPED OVER ENDS 150 mm (6") TO COVER DIKE TO DIKE JOINTS. JOINTS SHALL BE FASTENED WITH GALVANIZED SHOAT RINGS.
6. THE DIKE STRUCTURE SHALL BE MW40-150 mmX150 mm (6 GA. 6"x6") WIRE MESH, 450 mm (18") ON A SIDE.
7. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.
8. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6") AND DISPOSED OF IN A MANNER WHICH WILL NOT CAUSE ADDITIONAL SILTATION.
9. AFTER THE DEVELOPMENT SITE IS COMPLETELY STABILIZED, THE DIKES AND ANY REMAINING SILT SHALL BE REMOVED. SILT SHALL BE DISPOSED OF AS INDICATED IN GENERAL NOTE 8 ABOVE.

TRIANGULAR FILTER DIKE
N.T.S.



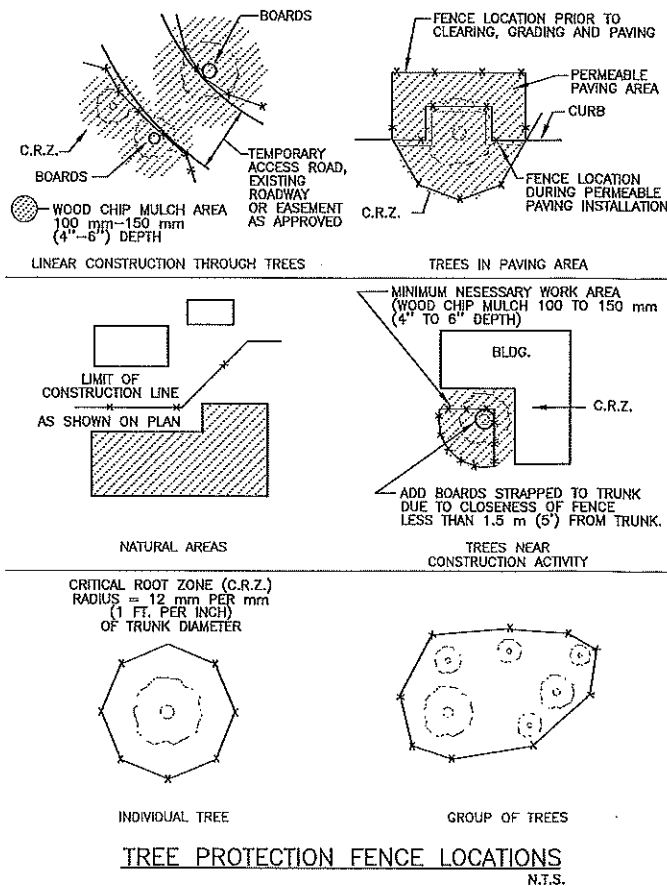
TREE PROTECTION (CHAIN LINK)
N.T.S.



NOTES:

1. STEEL POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12").
2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CAN NOT BE TRENCHED INTO THE SURFACE (E.G. PAVEMENT), THE FABRIC FLAP SHALL BE WEIGHTED DOWN WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 inches) DEEP AND 150 mm (6 inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST.
5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

SILT FENCE
N.T.S.



ANGEL BROTHERS ENTERPRISES
NEW BRAUNFELS OFFICE
WATER & WASTEWATER IMPROVEMENTS

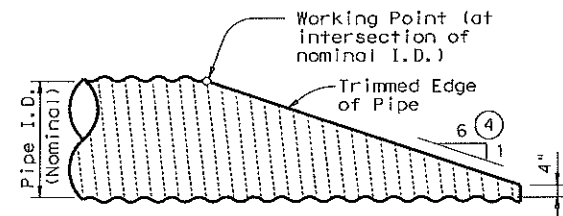
DESIGNED BY: FND
DRAWN BY: FND
REVIEWED BY: CL
APPROVED BY: DPH
PROJECT NO.: P171105
DATE: 1-30-19
SCALE: AS SHOWN
DWG. NO. D4
SHEET - OF -

HEJIL, LEE & ASSOCIATES, INC.
ENGINEERING • SURVEYING • PLANNING
206 TAYLOR STREET
HUNTSVILLE, TX 35894
PH: (512) 642-3292 FAX: (512) 642-4230
TBPE FIRM NO. F-755, TBPLS FIRM NO. 10058500

NO.	DR	OK	DATE	DESCRIPTION

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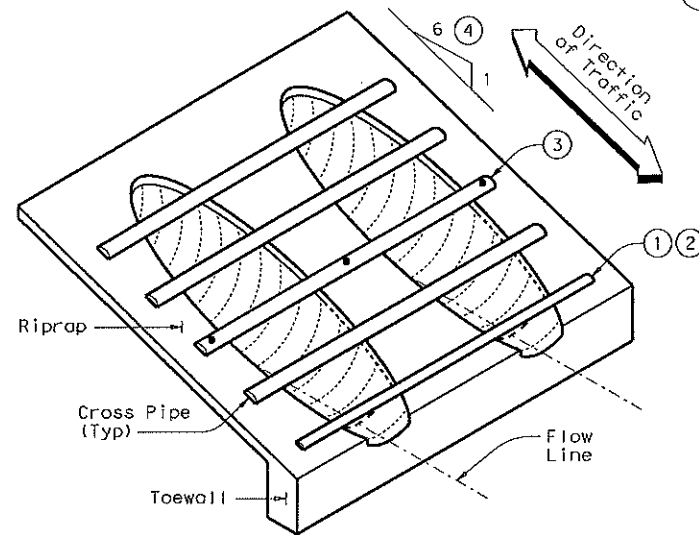
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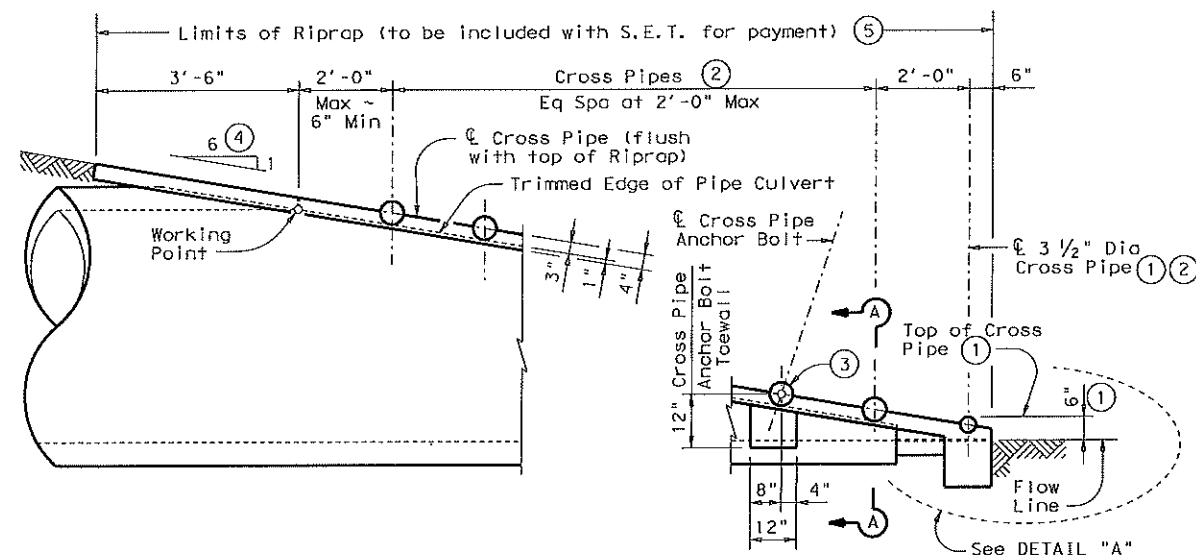
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing Corrugated Metal Pipe Culvert.)
(Details at Concrete Pipe Culvert are similar.)

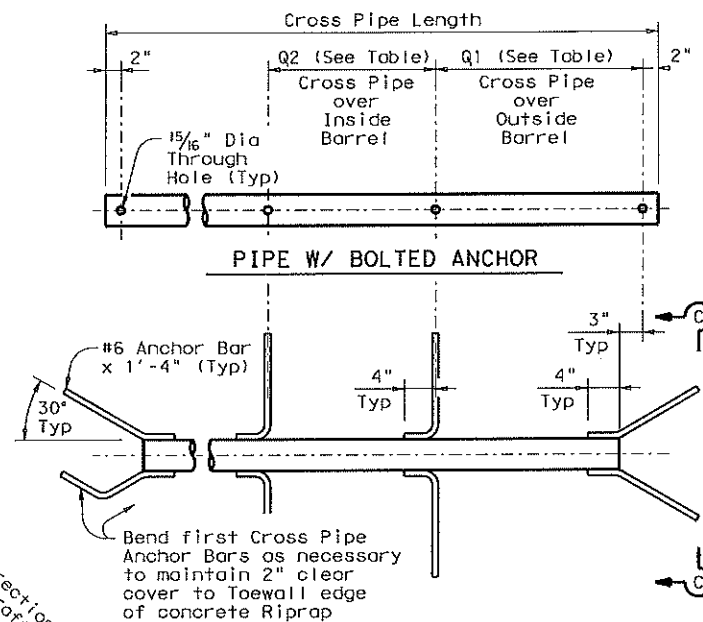


ISOMETRIC VIEW OF TYPICAL INSTALLATION

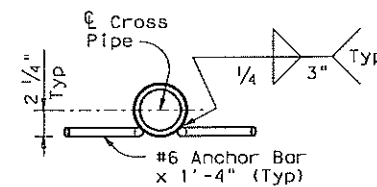


SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



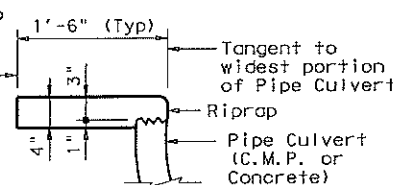
PIPE W/ ANCHOR BARS



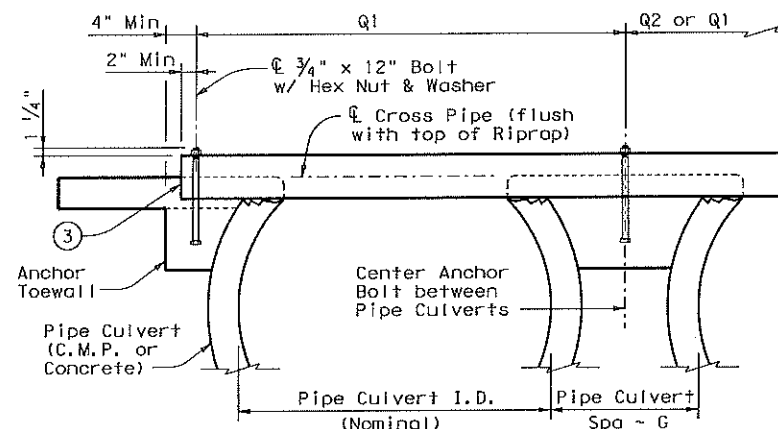
SECTION C-C

CROSS PIPE DETAILS

Limits of Riprap (to be included with S.E.T. for payment) ⑤

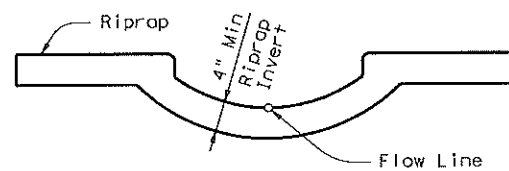


SHOWING TYPICAL PIPE CULVERT & RIPRAP



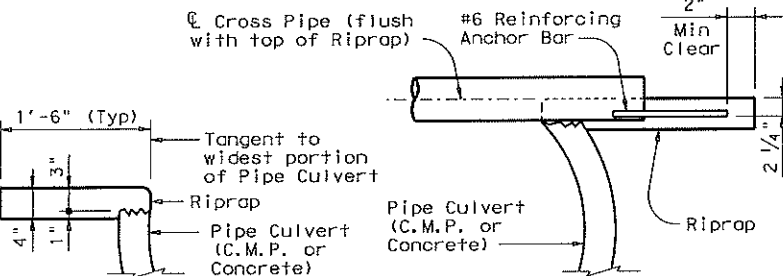
SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A



SECTION B-B

(Cross Pipes not shown for clarity.)



SHOWING CROSS PIPE WITH ANCHOR BAR

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES ②							
Nominal Culvert I.D.	Conc Riprap (CY) ⑥	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	9"	N/A	2'- 1"	1'- 9"	3 or more Pipe Culverts	3" Std (3.500" O.D.)
15"	0.7	11"	N/A	2'- 5"	2'- 2"		
18"	0.8	1'- 2"	N/A	2'-10"	2'- 8"		
21"	0.9	1'- 4"	N/A	3'- 2"	3'- 1"		
24"	0.9	1'- 7"	N/A	3'- 6"	3'- 7"		
27"	1.0	1'- 8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'- 2"	4'- 4"	2 or more Pipe Culverts	
33"	1.2	1'-11"	4'- 2"	4'- 5"	4'- 8"	All Pipe Culverts	4" Std (4.500" O.D.)
36"	1.3	2'- 1"	4'- 5"	4'- 9"	5'- 1"	All Pipe Culverts	
42"	1.5	2'- 4"	4'-11"	5'- 5"	5'-10"		
48"	1.7	2'- 7"	5'- 5"	6'- 0"	6'- 7"		
54"	2.0	3'- 0"	5'-11"	6'- 9"	7'- 6"	All Pipe Culverts	
60"	2.2	3'- 3"	6'- 5"	7'- 4"	8'- 3"		
66"	2.4	3'- 3"	6'-11"	7'-10"	8'- 9"		
72"	2.7	3'- 4"	7'- 5"	8'- 5"	9'- 4"		

- ① The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.
- ② Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).
- ③ The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may also be installed using the bolted connection details.
- ④ Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.
- ⑤ Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
- ⑥ Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe culverts or for Corrugated Metal Pipe Culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

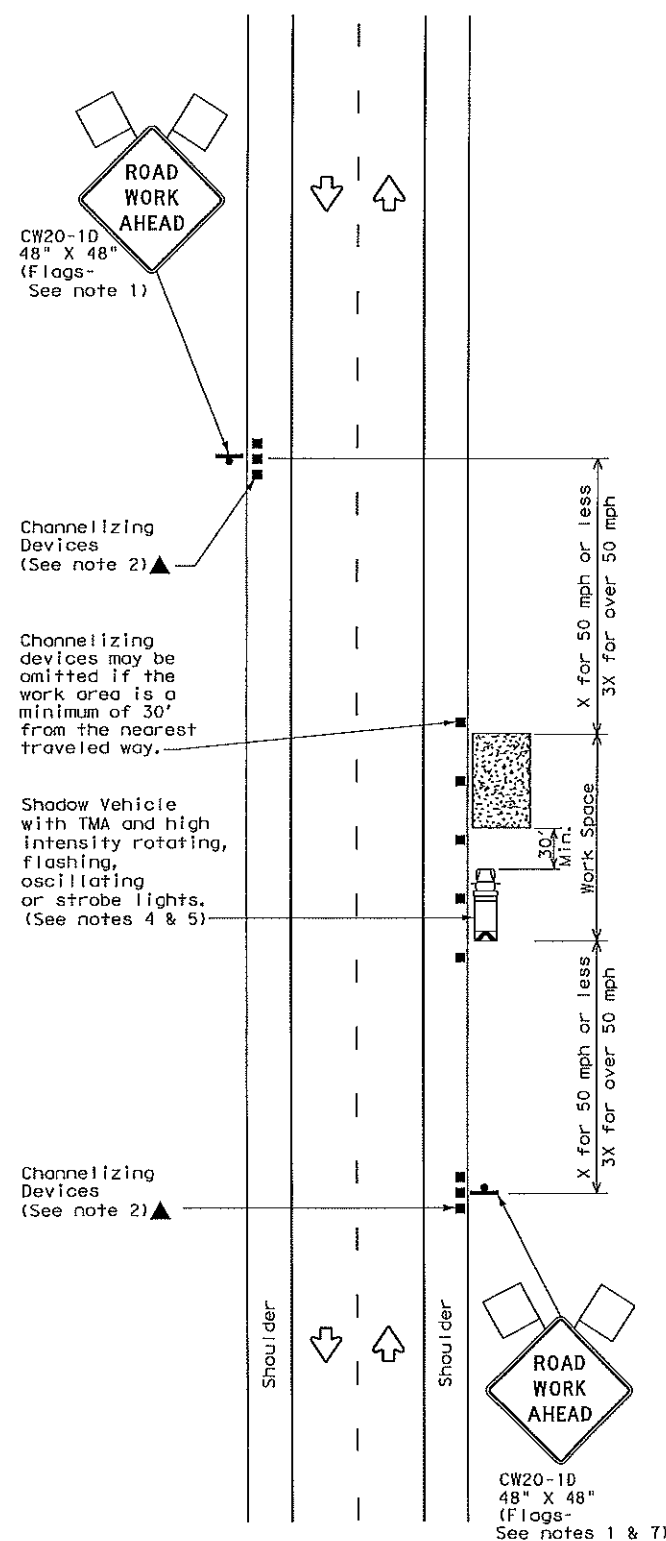
Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52. Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation		Bridge Division Standard	
SAFETY END TREATMENT			
FOR 12" DIA TO 72" DIA			
PIPE CULVERTS			
TYPE II ~ PARALLEL DRAINAGE			
SETP-PD			
FILE: setpdsedgn	DN: GAF	CK: CAT	DR: JRP
©TxDOT February 2010	COM: SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.
11-10: Add note for synthetic fibers.			

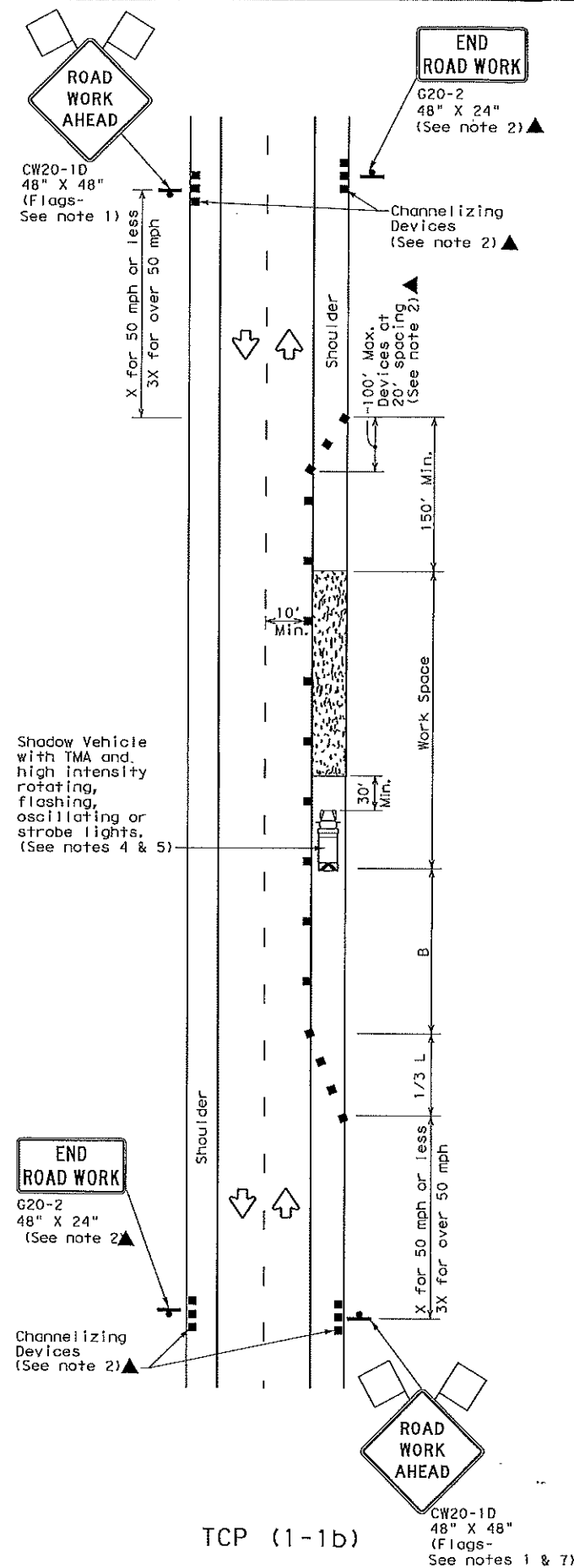
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DATE: FILE:



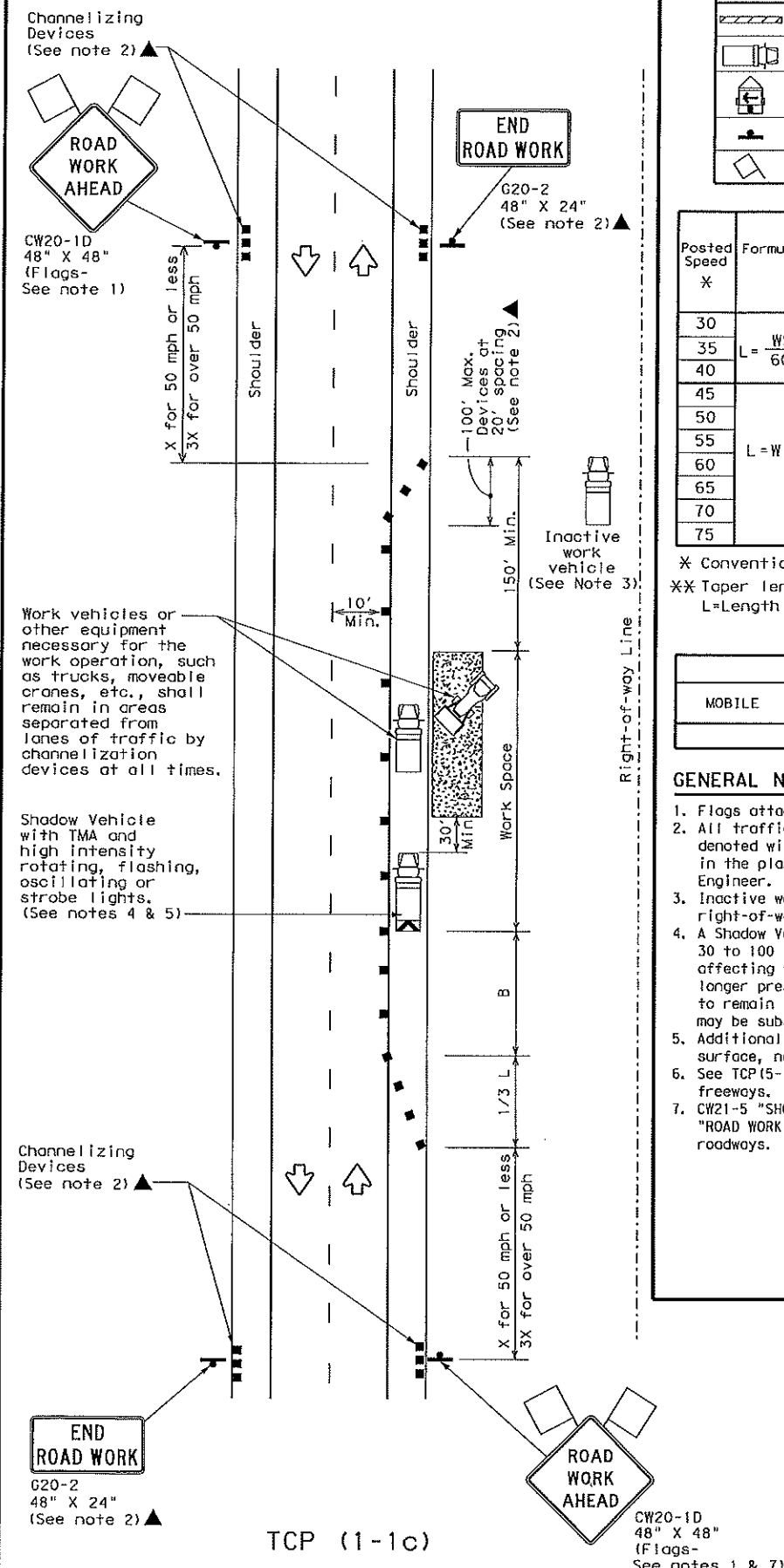
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed %	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "X"	Suggested Longitudinal Buffer Space "B"
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent		
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50	L=WS	500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
- See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
- CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.



TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

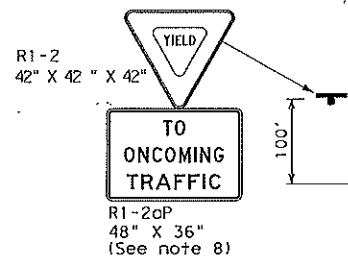
TCP(1-1)-18

FILE: tcpl-1-18.dgn	DW:	CK:	DN:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY	SHEET NO.	
2-94 4-98				
8-95 2-12				
1-97 2-18				

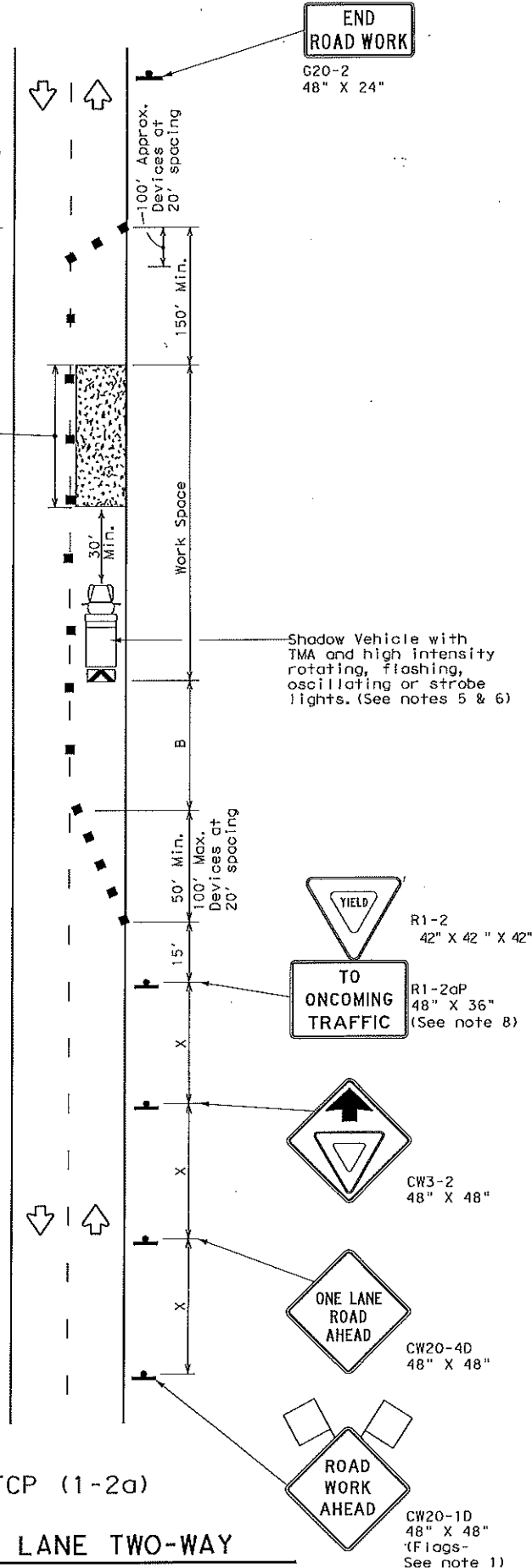
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DATE: _____
FILE: _____

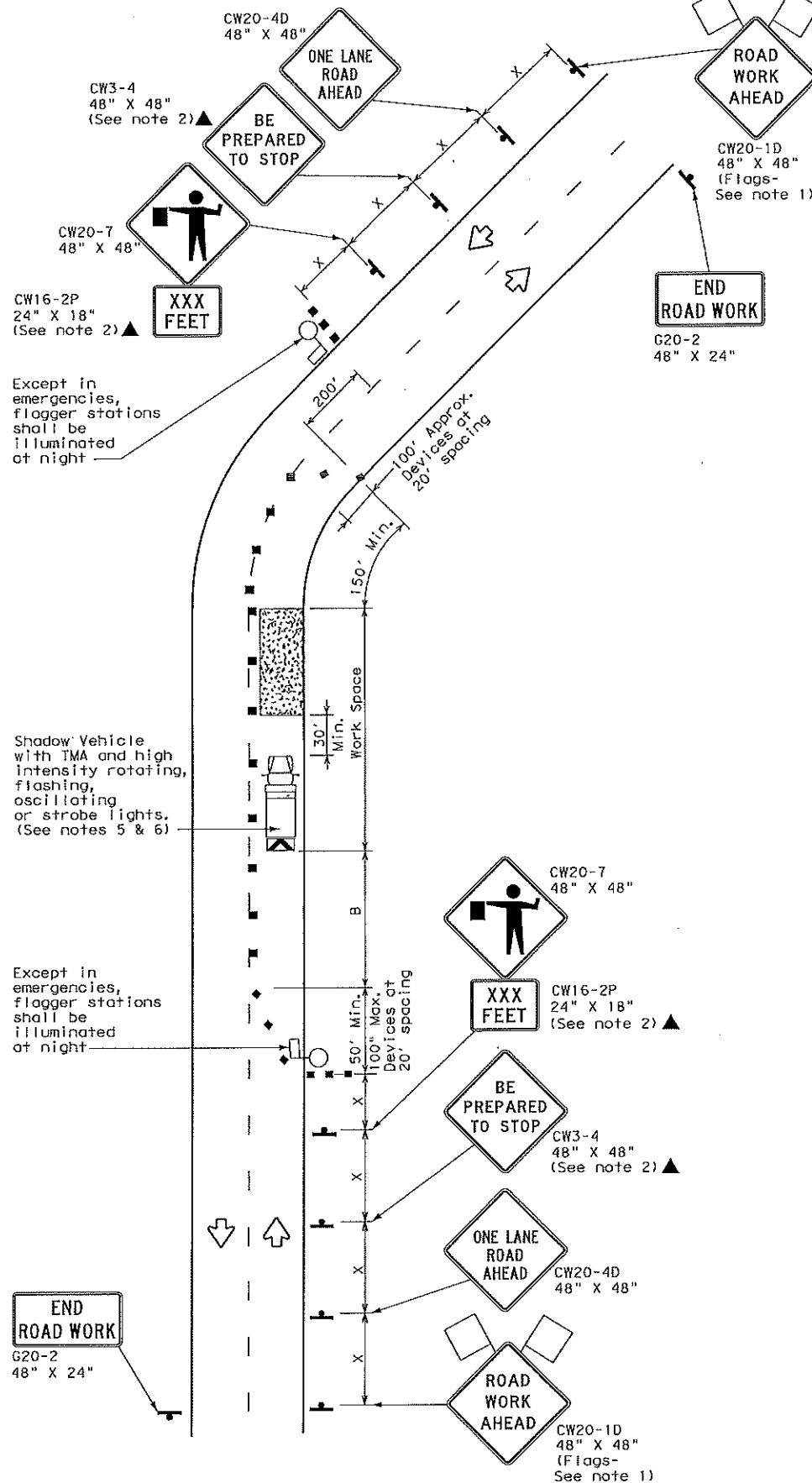
Warning Sign Sequence
in Opposite Direction
Same as Below



Channelizing devices
separate work space
from traveled way



TCP (1-2a)
**ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS**
(Less than 2000 ADT - See note 7)



TCP (1-2b)
**ONE LANE TWO-WAY
CONTROL WITH FLAGGERS**

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board		Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths **			Suggested Maximum Spacing of Channelizing Devices		Minimum Sign Spacing "x" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent			
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45		450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55	$L = WS$	550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only

** Taper lengths have been rounded off.

L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

- Flags attached to signs where shown are REQUIRED.
- All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
- The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
- Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
- A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
- Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

- R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
- R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

- Flaggers should use two-way radios or other methods of communication to control traffic.
- Length of work space should be based on the ability of flaggers to communicate.
- If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
- Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
- Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

		Traffic Operations Division Standard	
TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL			
TCP (1-2) - 18			
FILE: top1-2-18.dgn	DWG: _____	CHK: _____	CHK: _____
© TxDOT December 1985	CONF: _____	SECT: _____	JOB: _____ HIGHWAY: _____
REVISIONS		DIST: _____ COUNTY: _____ SHEET NO. _____	
4-90 4-98			
2-94 2-12			
1-97 2-18			